AMERICAN UNIVERSITY OF BEIRUT

UNDERGRADUATE CAPSTONE PROJECT
IN
LANDSCAPE ARCHITECTURE

SUBMITTAL FORM

Reclaiming the Right to Water: Hasbani River as resource

by
Lama Amin Amin

LDEM 242- ADVANCED DESIGN
SPRING **2019-2020**
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PRIMARY ADVISOR:
Maria Gabriella Trovato
SECONDARY ADVISORS:
Balsam Al Ariss
Mona Khechen

Approved by Project Coordinator:

[Signature]

Maria Gabriella Trivato, Assistant Professor
Department of Landscape Design and Ecosystem Management

Date of project pres **May 8, 2020**

AMERICAN UNIVERSITY OF BEIRUT

THESIS, DISSERTATION, PROJECT RELEASE FORM

Student Name: **Amin** **Lama** **Amin**
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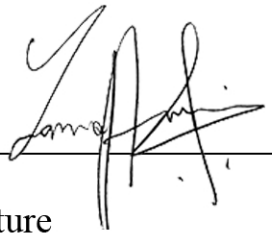

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RECLAIIMING THE RIGHT TO WATER

HASBANI RIVER AS A RESOURCE

LAMA AMIN - FINAL YEAR PROJECT

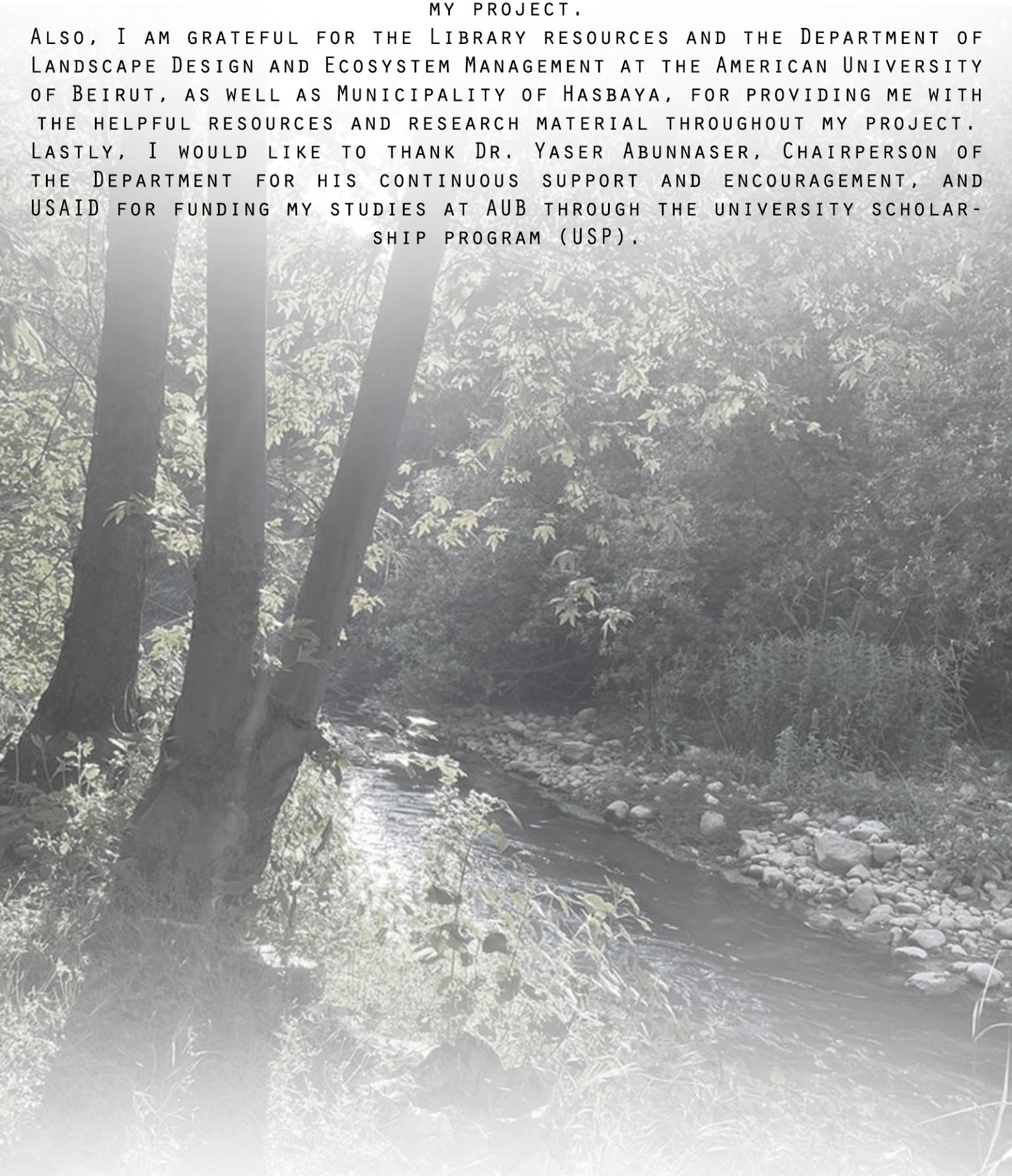
LANDSCAPE ARCHITECTURE

TABLE OF CONTENT

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to several individuals and organizations for supporting me throughout my final year project. First, I wish to express my sincere gratitude to my supervisors, Professors Trovato, Al Ariss, and khechen, for their enthusiasm, patience, insightful comments, helpful information, practical advice, and unceasing ideas that have helped me tremendously at all times in my project.

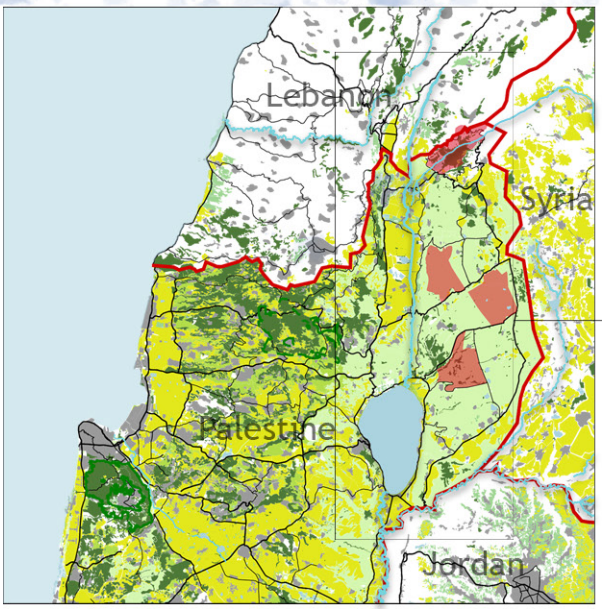
Also, I am grateful for the Library resources and the Department of Landscape Design and Ecosystem Management at the American University of Beirut, as well as Municipality of Hasbaya, for providing me with the helpful resources and research material throughout my project. Lastly, I would like to thank Dr. Yaser Abunnaser, Chairperson of the Department for his continuous support and encouragement, and USAID for funding my studies at AUB through the university scholarship program (USP).

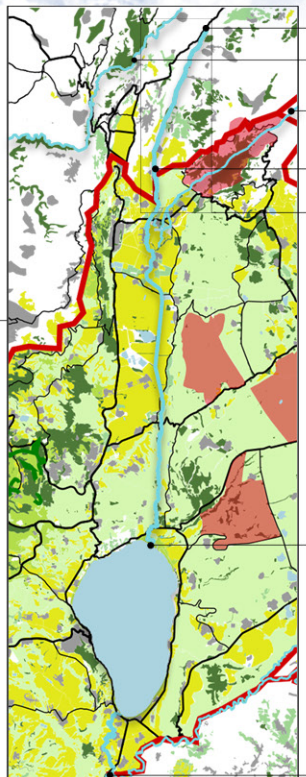


PROJECT STATEMENT

HASBANI RIVER, A MAJOR TRIBUTARY OF THE JORDAN RIVER, RUNS FOR 25 MILES IN LEBANON BEFORE CROSSING THE BORDER AND REACHING OCCUPIED PALESTINE. LEBANON'S RIGHTFUL SHARE OF THIS RIVER IS 35 MILLION M3 IN WATER VOLUME, BUT REGIONAL CONFLICTS HAVE LED TO THE UNDER-UTILIZATION OF THE RIVER AS A WATER RESOURCE FOR ITS SURROUNDING AREAS, AND POOR MANAGEMENT RESULTED IN THE POLLUTION OF IT. MY PROJECT AIMS TO RECLAIM THE RIGHT OF THESE SURROUNDING AREAS AND THEIR INHABITANTS TO CLEAN WATER, AND TO REVIVE THE RIPARIAN ECOSYSTEM THAT WAS FADING AWAY IN SOME AREAS. IT SEES THE RIVER AS A NATURAL AND CULTURAL RESOURCE THAT CAN PROTECT THE ECOSYSTEMS SURROUNDING IT AND CONTRIBUTE TO IMPROVING THE QUALITY OF LIFE OF LOCAL COMMUNITIES AND FUTURE GENERATIONS.

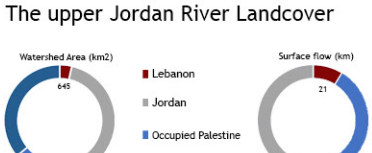
SITE CONTEXT



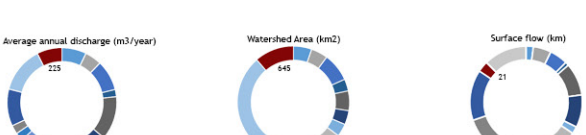


Millitary zone | Meadows | Rivers
Urban areas | Scrub Lands | International Roads
Orchards | Farmlands | Primary Roads
Wooden Forests | National Borders

The upper Jordan River Landcover



Lebanon's part of Jordan River



Hasbani in relation to the total of rivers in Lebanon

Hasbani River flow in Lebanon

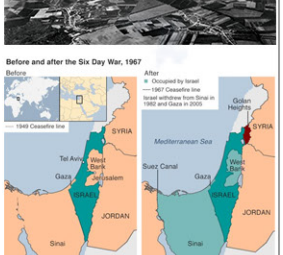
INVENTORY

Due to the controvorsial geopolitical location and context on the borders, I have studied the major events and decisions in history that have affected this river

1948-1956
"Israel National water carrier"

1964
Arab countries convention project.

1967
Six days war and occupation of golan heights.



Water pump

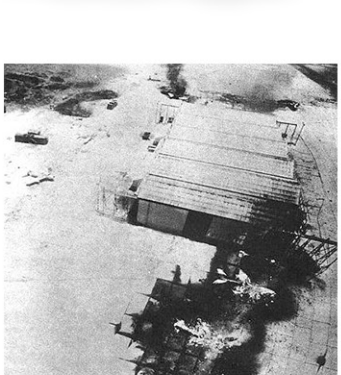
Lebanon's
Lebanon's
Lebanon's si
Actual quan
Total of wat

Water distribution from each plan
Quantities in million cubic meters

Plan	Israel	Jordan	Syria	Lebanon	Total
Johnston (1953)	394	774	45	0	1,213
Cotton (1954)	1,290	575	30	451	2,346
Arab (1954)	182	698	132	35	1,047

Source: Data compiled by the author from the three proposals: Johnston 1953, Cotton 1954, and Arab Technical Committee, 1954.

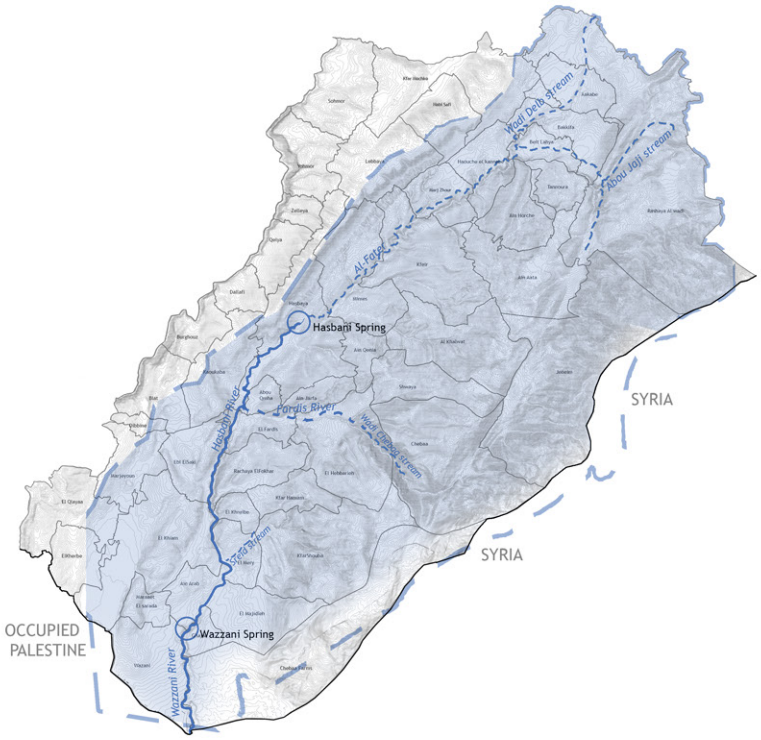
Water Distribution Plans
1953-1954



Isareli destruction of the project's works
1965-66

"Operation Litani and Isareli occupation of sou
Lebanon and water pumpir
1978-200

SITE CONTEXT



Watershed Map



Al Hasbani River



Fardis River



Al wazzani spring



Al Hasbani spring



INVENTORY

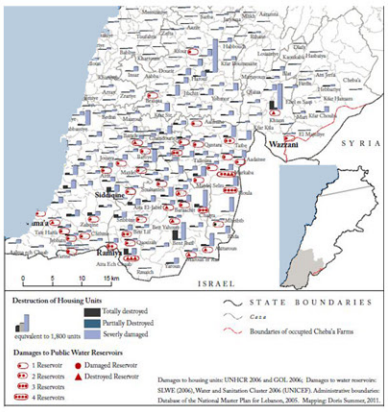
1994

ing station established in Hasbaya on Hasbani Source.

rightful share of water	35 Mm3/year
share from hasbaya pump	12Mm3/year
hare after 2002 wazzani conflict	7 Mm3/year
tity pumped today from wazzani	4.4 Mm3/year
er pupmed today	17 Mm3/year

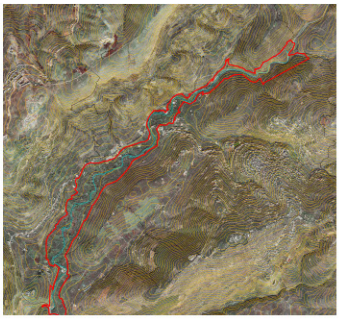
2006

South Lebanon summer war : Reservoir and pumps at the booster station partially destroyed.Destruction of public water reservoires



2019

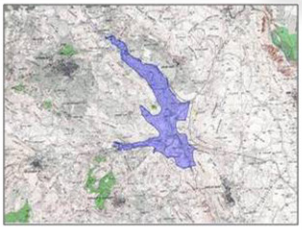
Zoning of Hasbani river in Hasbaya as Zone P: Touristic



Max Residential Built allowed in a lot	5%
Max Touristic Built Allowed in a lot	15%
Max height	5 m
Minimum set back from river bank	15 m
Sound Noise allowed	Until 12 am

Wazzani Pumps project and sewage water plant implimented for Hasbaya village only

2002



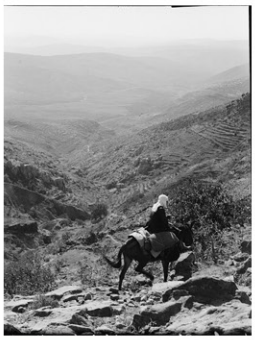

Ibl Al saki Dam project part of GDHER integrated water resource plan for Lebanon-Not Implimented

2010

I N V E N T O R Y

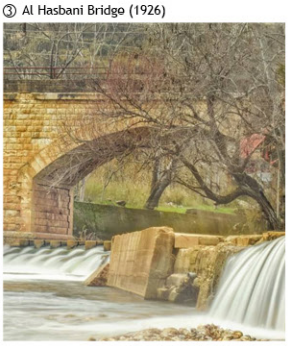
After studying the landuses and activities along the river, it was noticed that agriculture is the dominant landuse along the whole river, with tourism in certain areas.

① Wadi Al fator



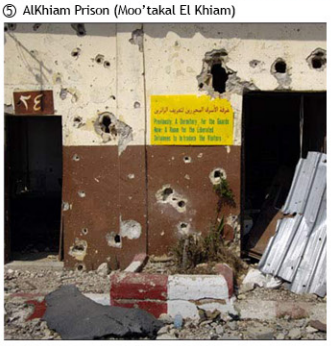
② Abo Wadih Bridge (1217)

③ Al Hasbani Bridge (1926)

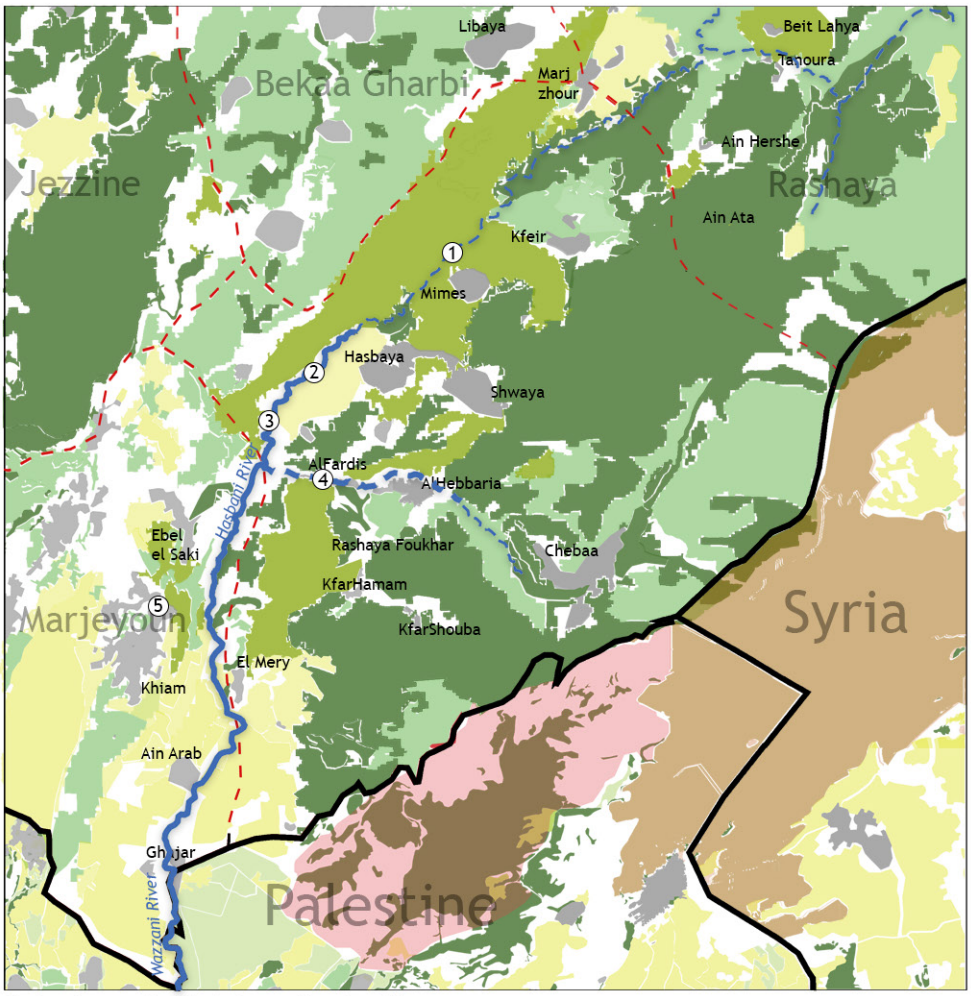


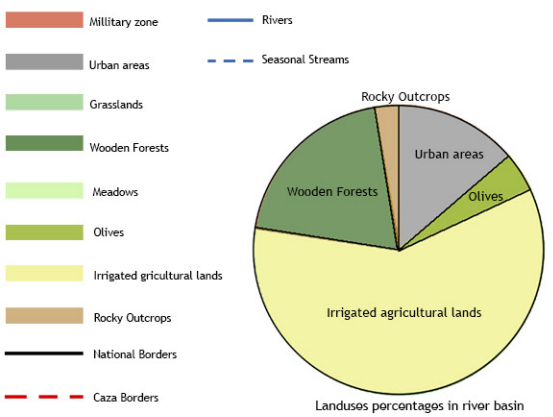
④ Souk El Khan

⑤ AlKhiam Prison (Moo'takal El Khiam)



Historical and cultural elements



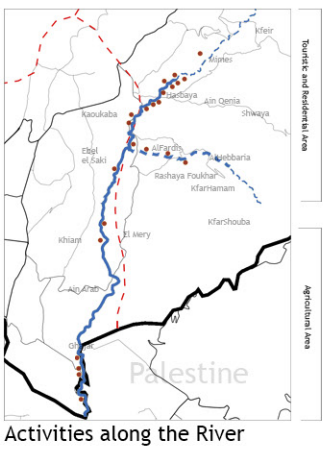


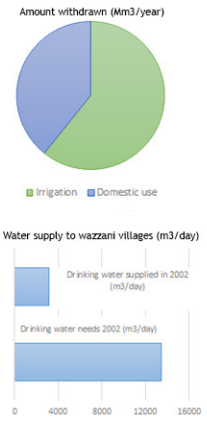
Wooden Forests

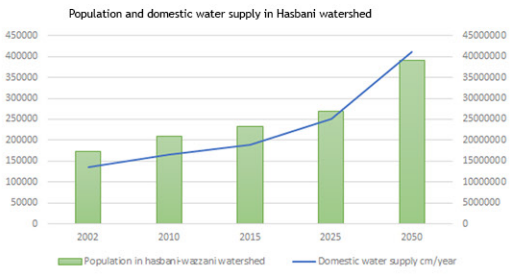
Olives

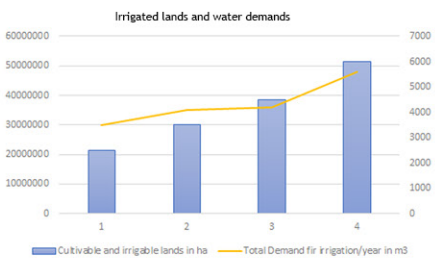
Irrigated agricultural lands

Hasbani watershed in Lebanon Landuse Map









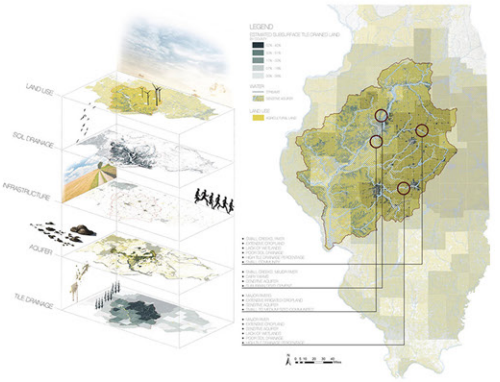
Activities along the River

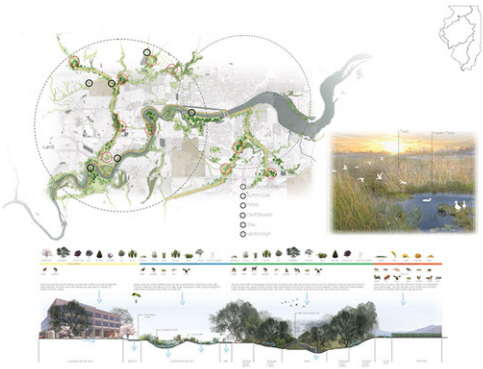
R E S E A R C H

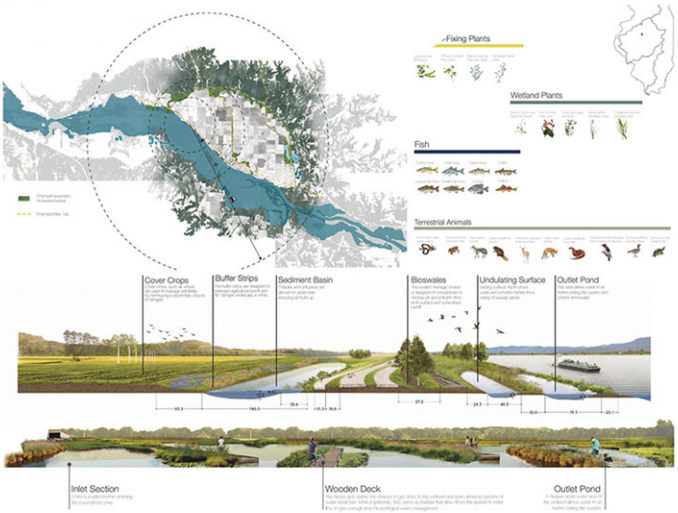
Case study 1: Water and the Agricultural Landscape of Illinois

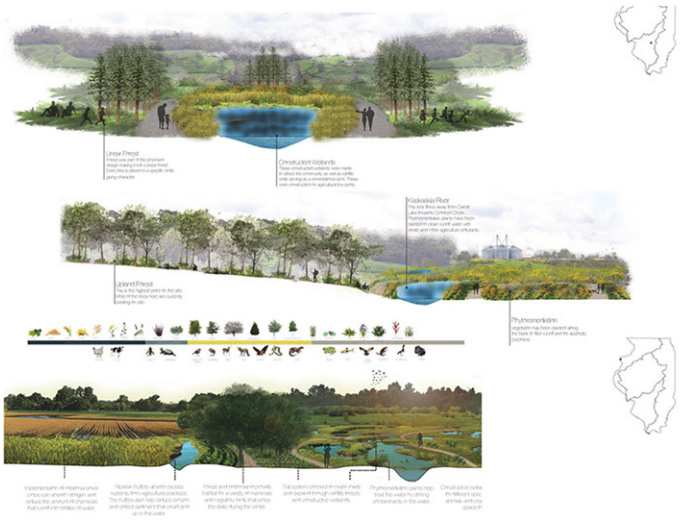
Project realized by students in University of Illinois at Urbana-Champaign.
ASLA 2017 student award of excellence in analysis and planning.

Since the passing of the 1972 Clean Water Act, the United States has been fairly successful at reducing point source contaminant loads in its nation's water resources. However, despite the relative success, progress needs to be made to ensure water quality. Non-point sources are generally unregulated and continue to adversely affect water quality efforts. Agricultural runoff accounts for the majority of non-point source discharges. Unfortunately, the fertilizers that usually ensure crop health ultimately place distress on aquatic systems. The state of Illinois is one of the leading contributors of fertilizer contaminant loads to the Mississippi River, and in turn the state has a tentative goal of reducing nitrogen and phosphorus loads by 45%. By framing agricultural strategies in the context of landscape architecture, the project aims to provide thoughtful solutions to agricultural issues while keeping the well being of farmers in mind. Instead of completely changing the science behind agricultural practices, the suggested series of interconnected projects offer complementary design strategies such as constructed wetlands to reduce the detrimental effects of nitrogen and phosphorus fertilizers.





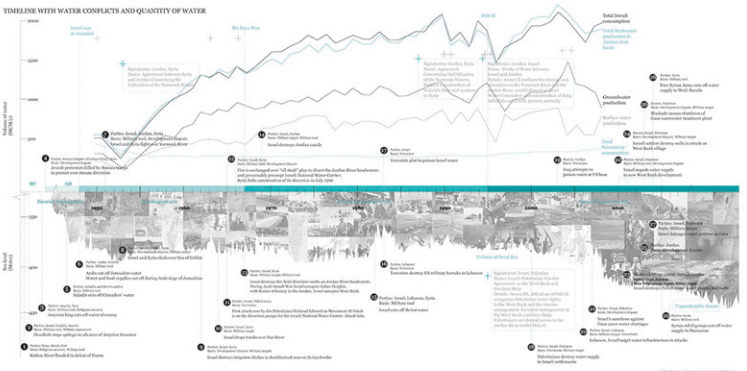


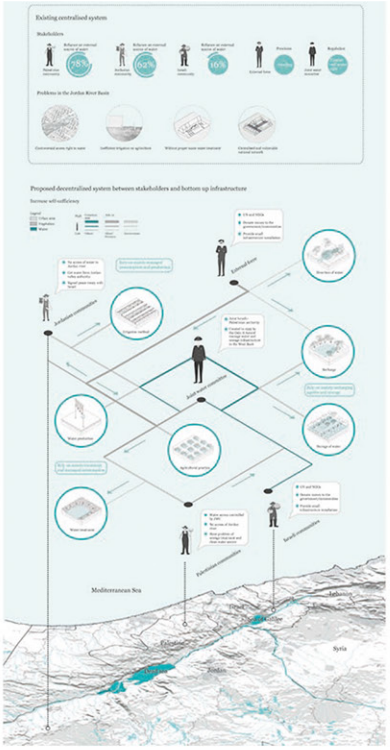


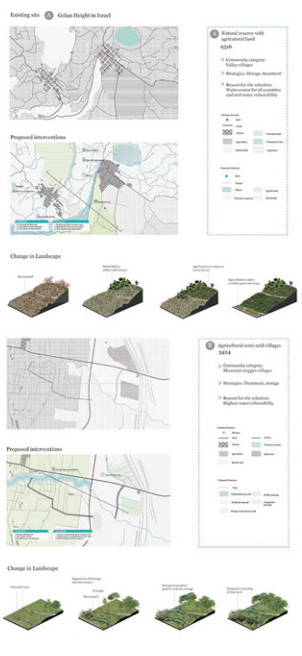
Case study 2: Water as Conflict Mediator: A Toolkit for a Decentralised System in Jordan River Basin

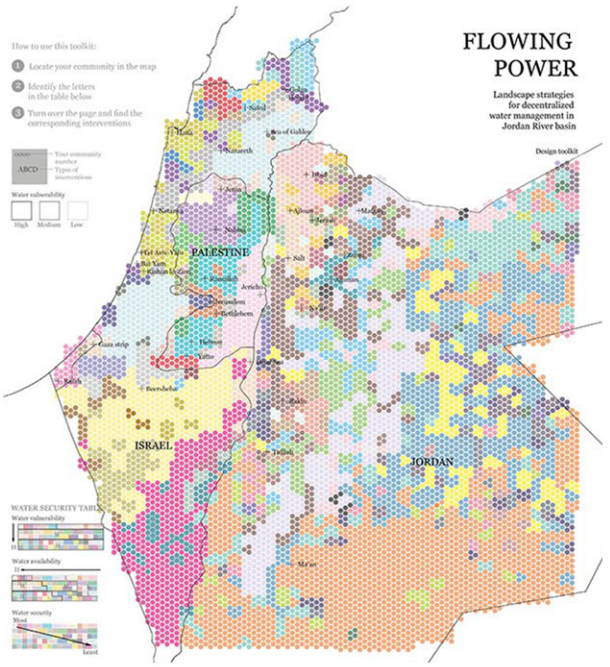
Project realized by Natalie Wai Yan Law from University of Hong kong.
ASLA 2019 student award of honor in analysis and planning.

The project examines the impact of transboundary water politics on water supply and the access rights in the Jordan River Basin. It proposes a new design framework that enables an inclusive and participatory new strategic plan for a decentralized system to achieve water security at the community level and to resolve conflicts at the regional level. It offers a viable alternative to the current centralized water management system and proposes to assert water security as a critical role in achieving political stability. Navigating between the geopolitical system and landscape features within the shared river basin, the project enables community capacity building to attain water security. It proposes a new link between water and stability, and provides a strategic toolkit that transforms water into a conflict mediator.



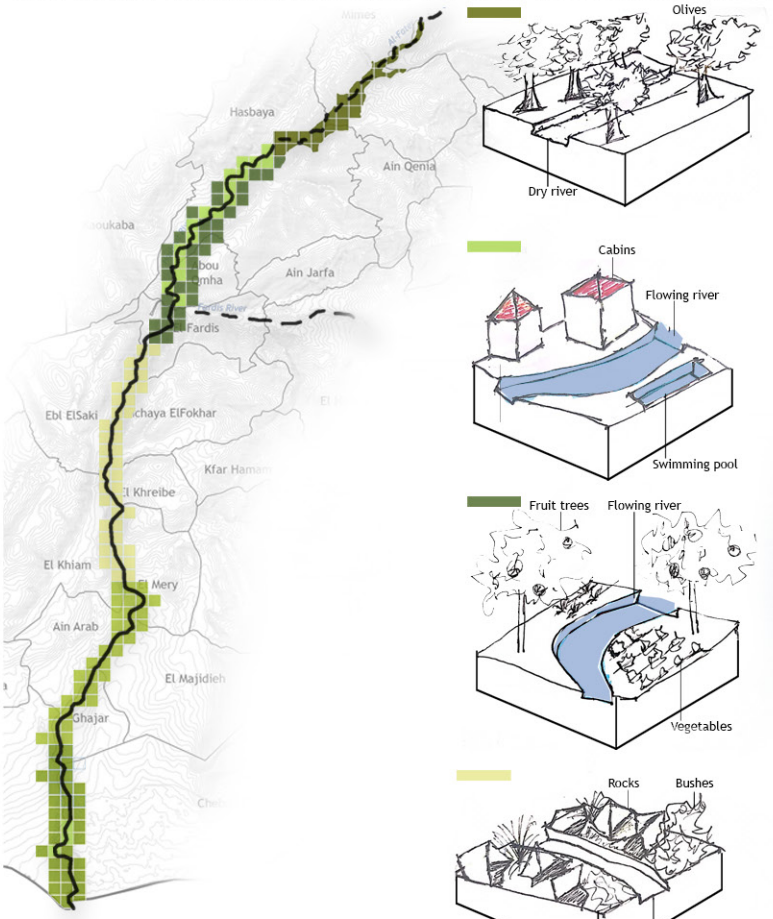


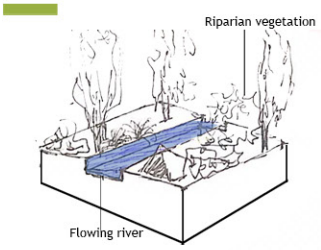


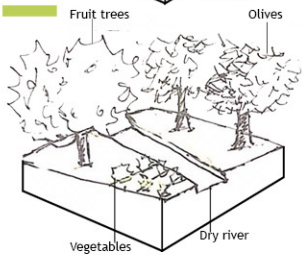


A N A L Y S I S

In my analysis I typologized the dominant land covers and riverbed typologies along the river, and I looked up the evolution of the landscape with time and how



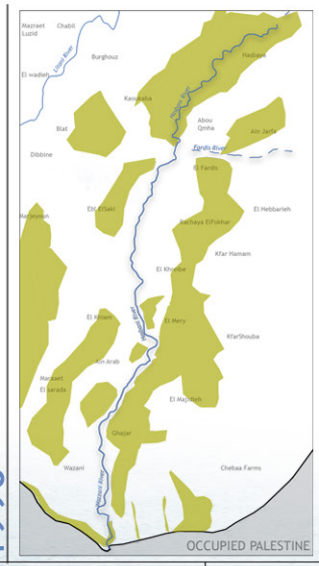


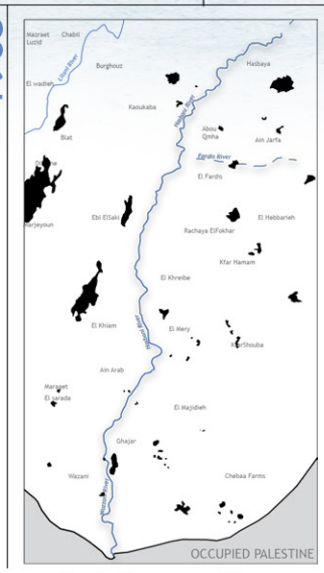


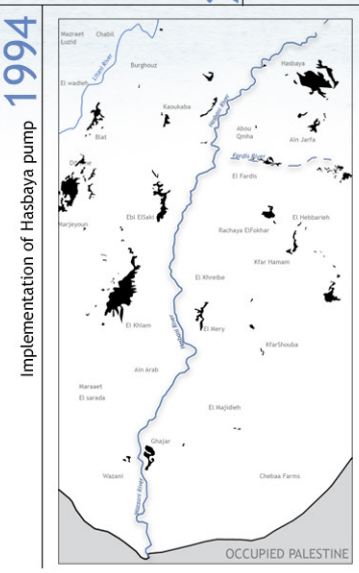
Riverbed Typologies

Agriculture

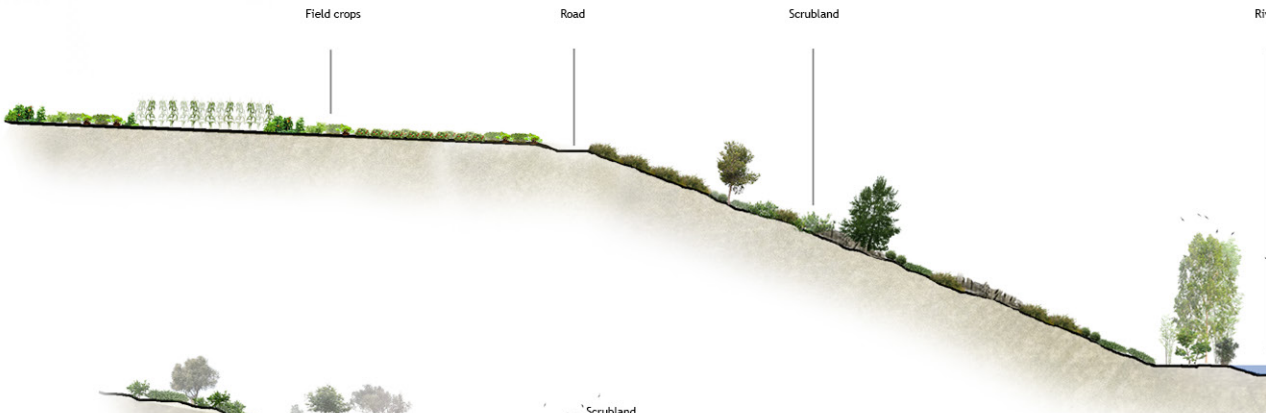
Urban sprawl







Landscape Evolution over time



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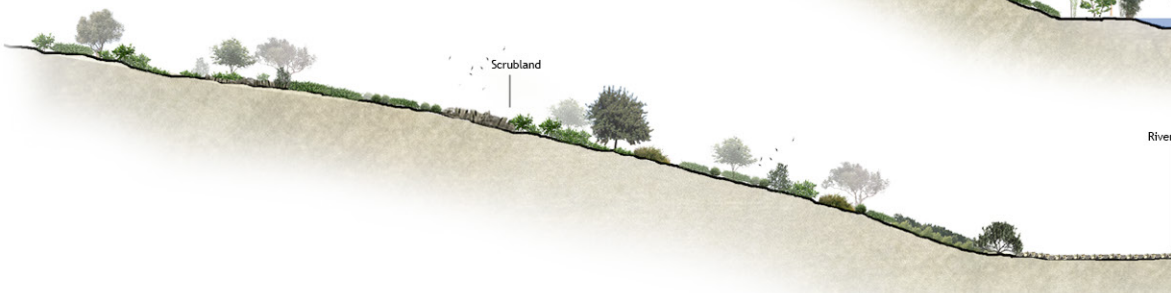
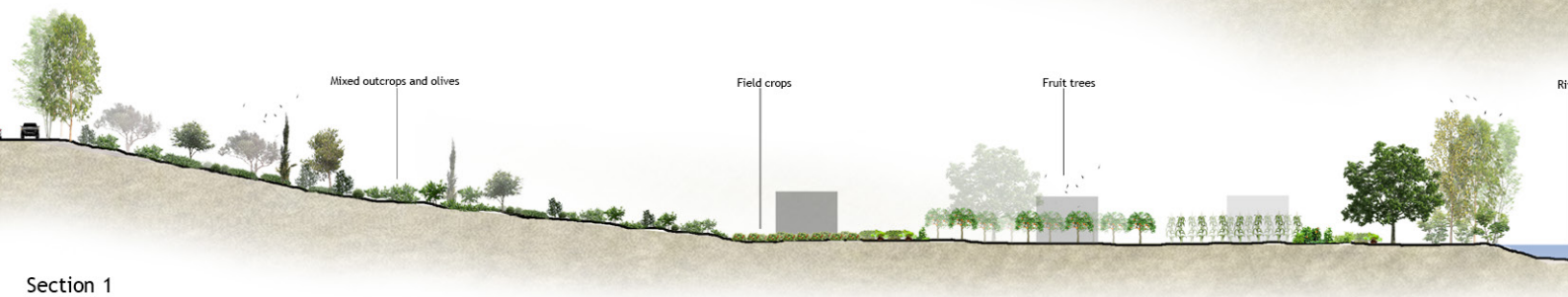


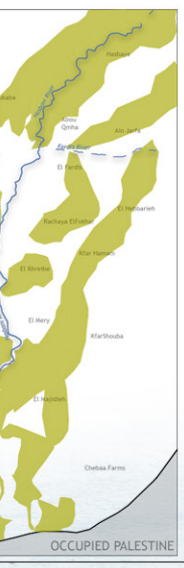
Section 2



Section 1

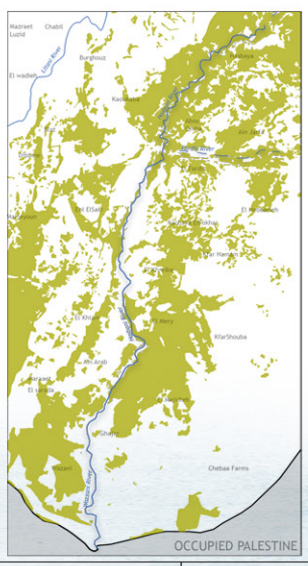
A N A L Y S I S

it's related to historical and cultural elements



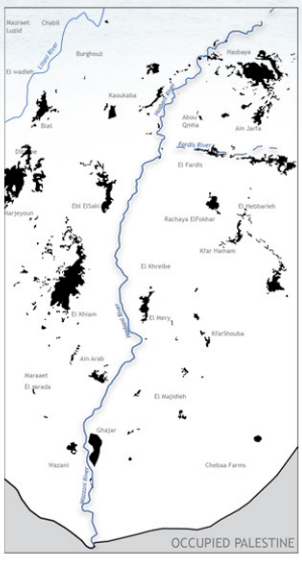
2002 Implementation of wazani pump

2010

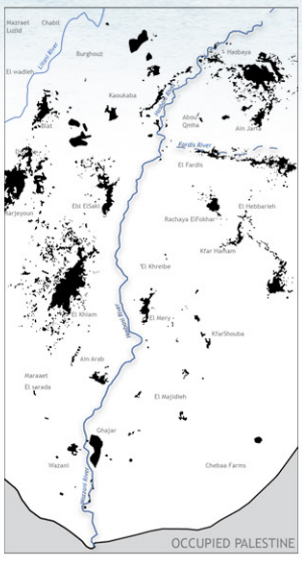


2017

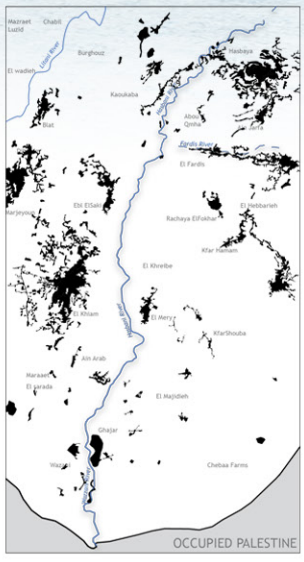
2005

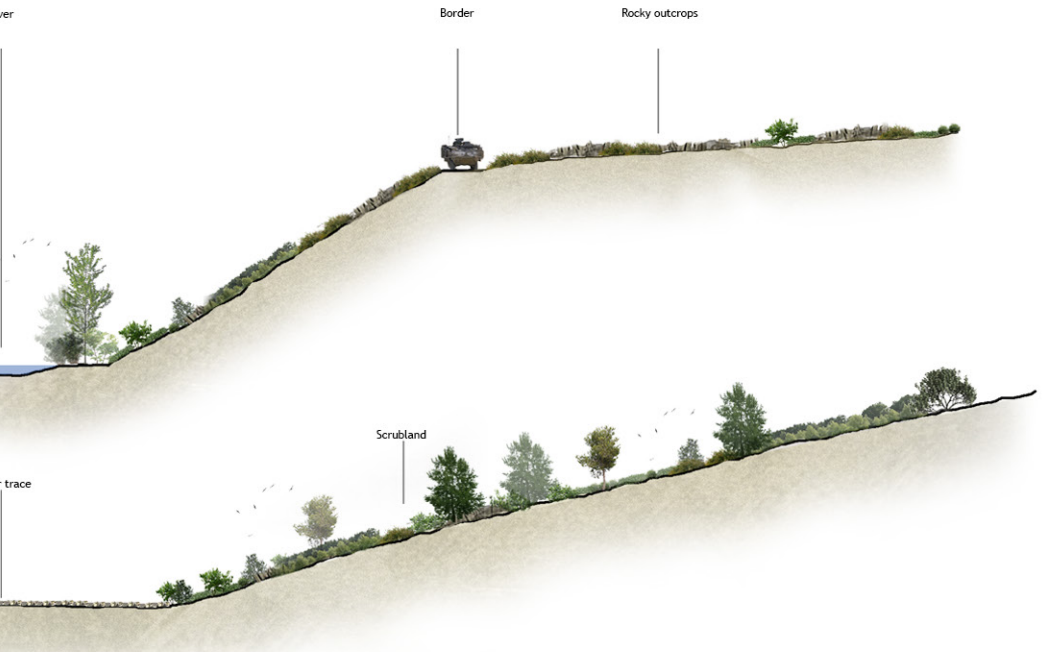


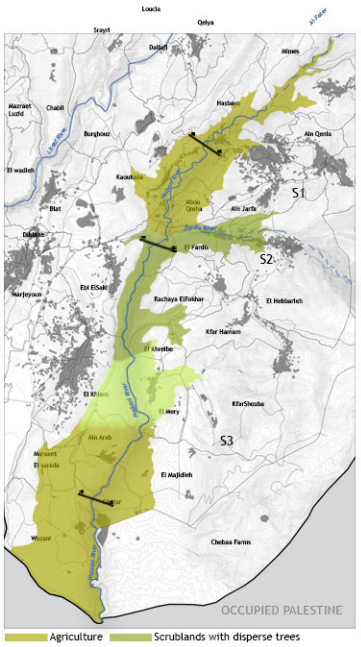
2013



2017

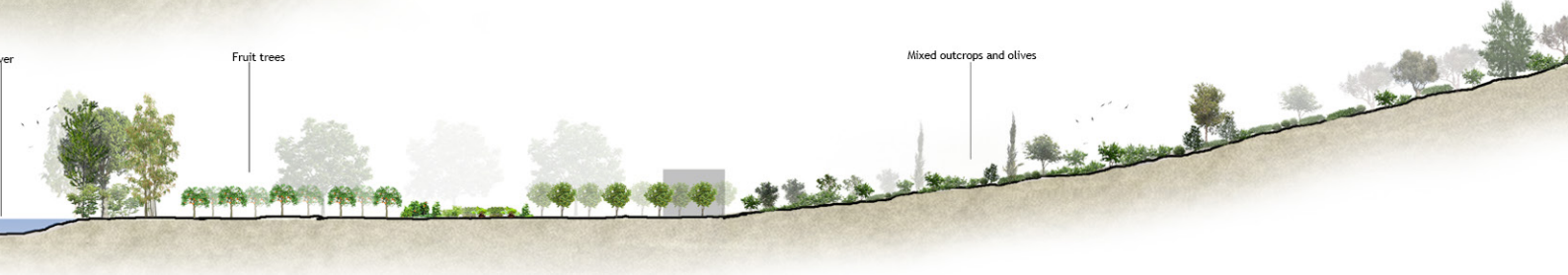






Agriculture Scrublands with disperse trees
Grasslands

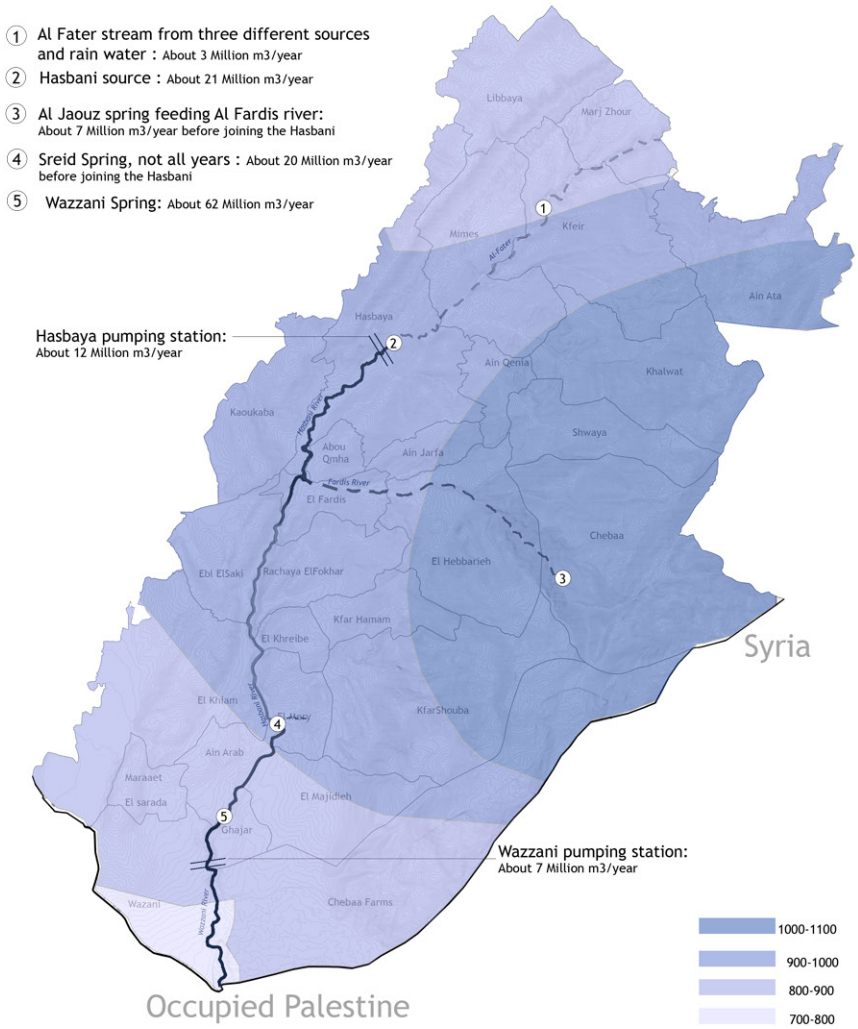
Dominant landcovers along the river



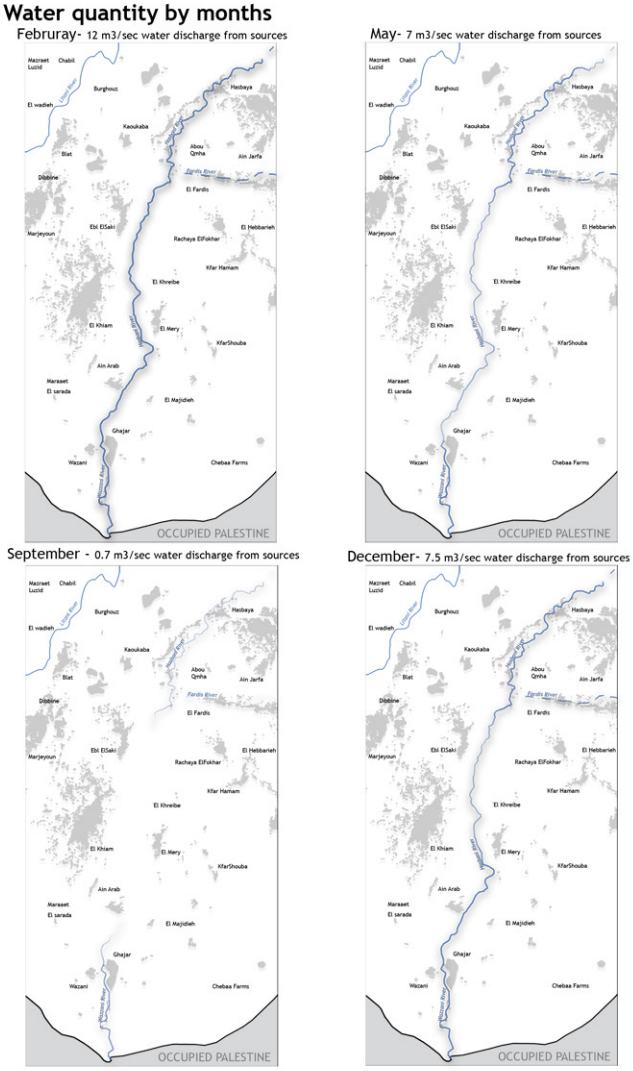
A N A L Y S I S

I focused on three main components: Water, its quanitiy and need for it; Agriculture, the dominant landcover along the river; and Pollution which constitute

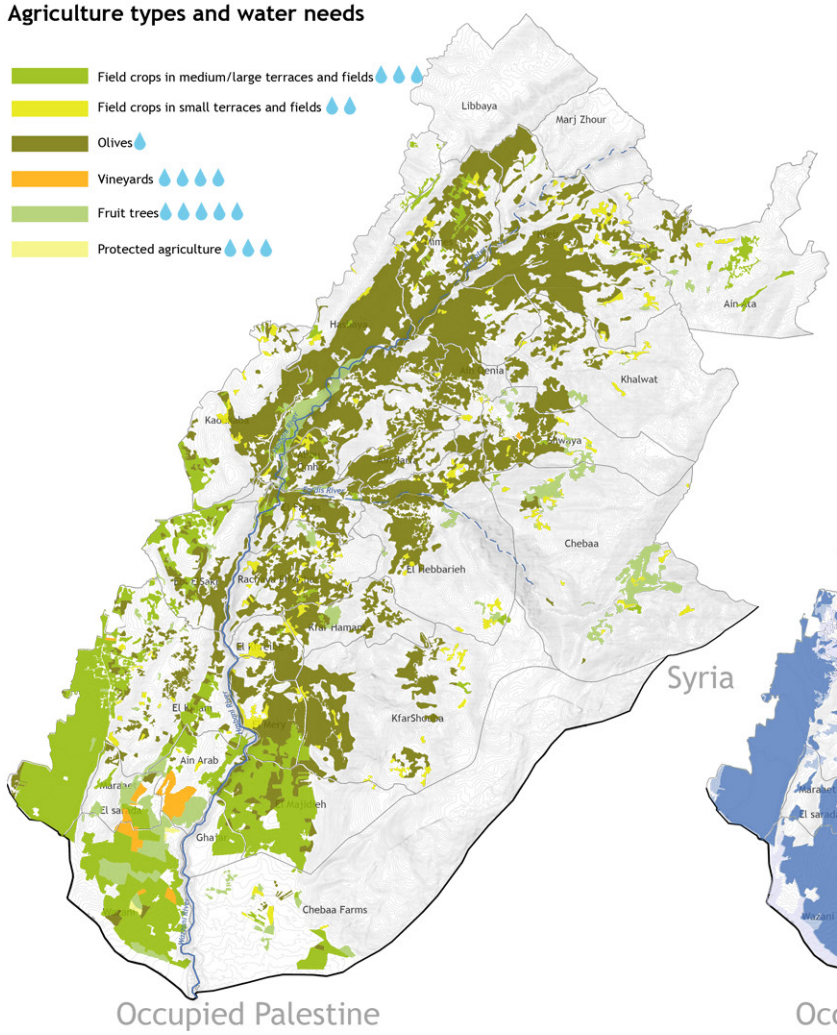
Water quantity analysis with relation to rainfall



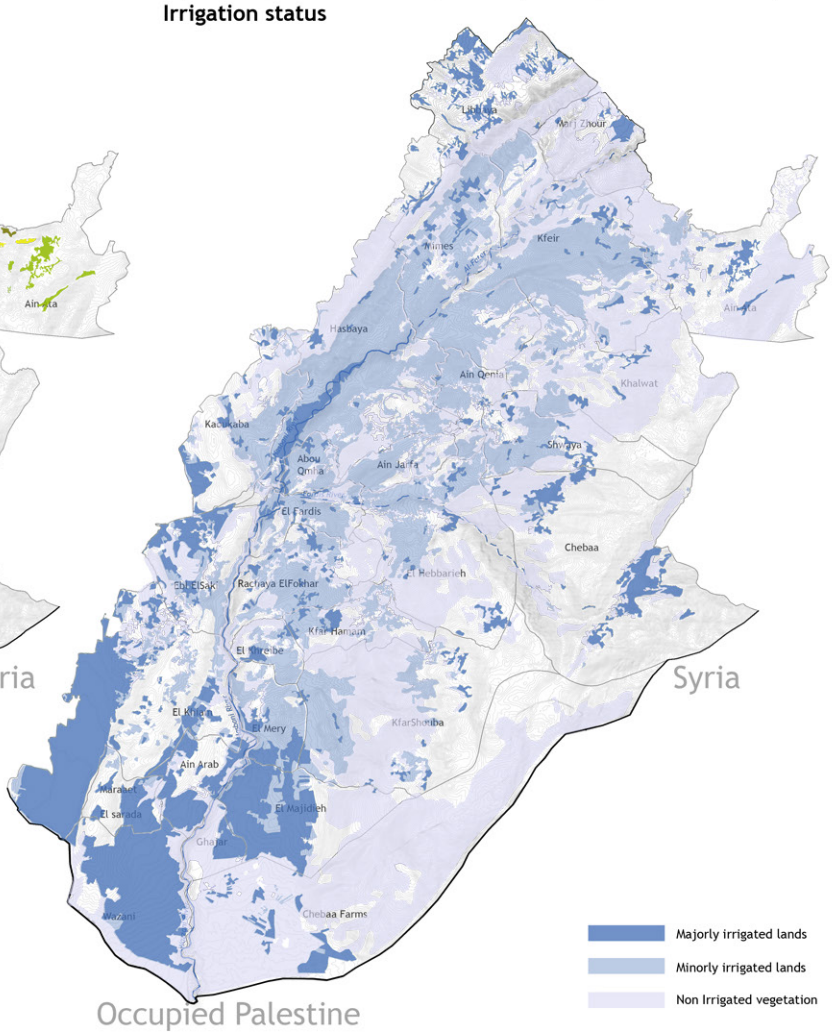
Water quantity by months



Agriculture types and water needs



Irrigation status

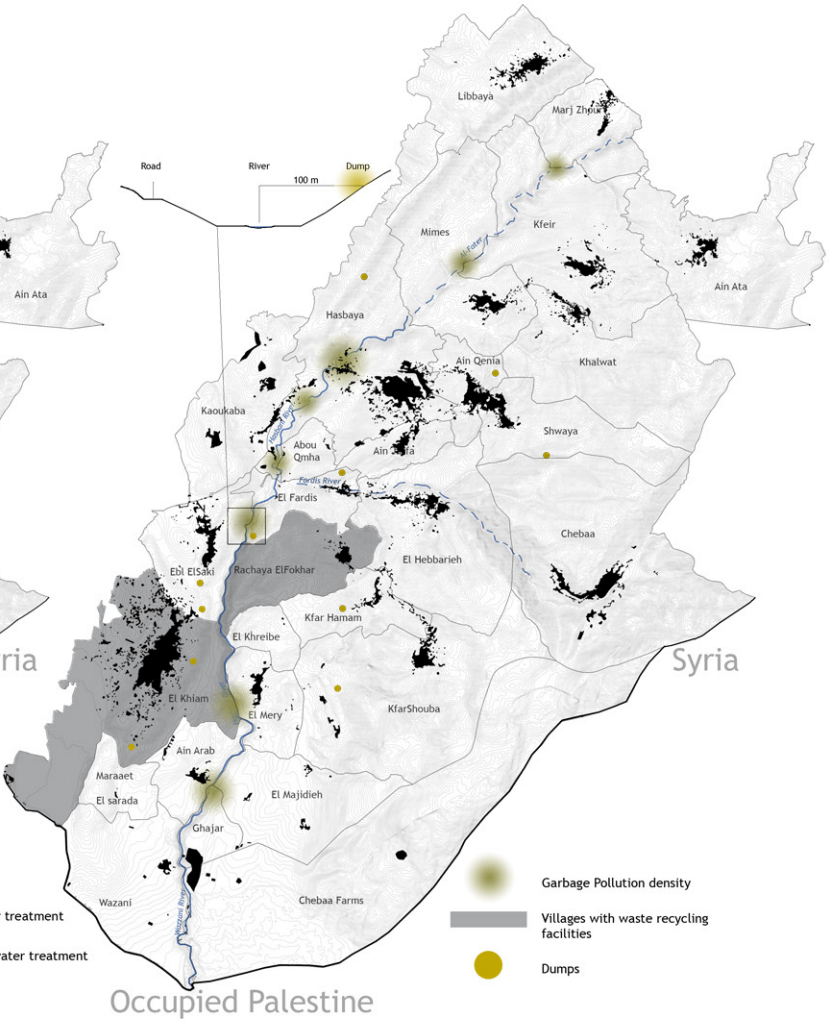


A N A L Y S I S

an obstacle constraining people from practicing their Right to Water.

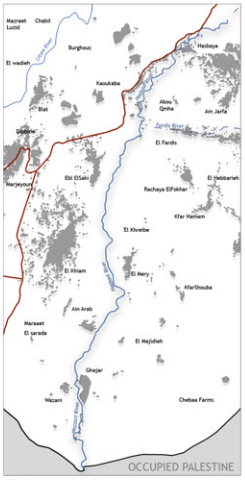
Household resulting Pollution: Sewage

Household resulting polution: Garbage



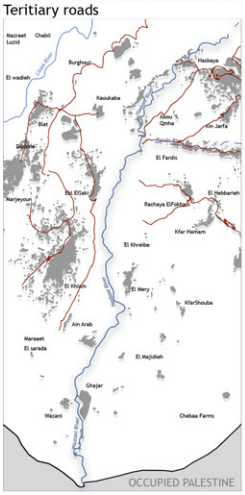
Proximity of roads infrastructure to the water course

Truck roads

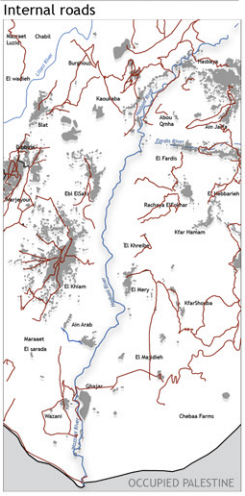


Secondary roads

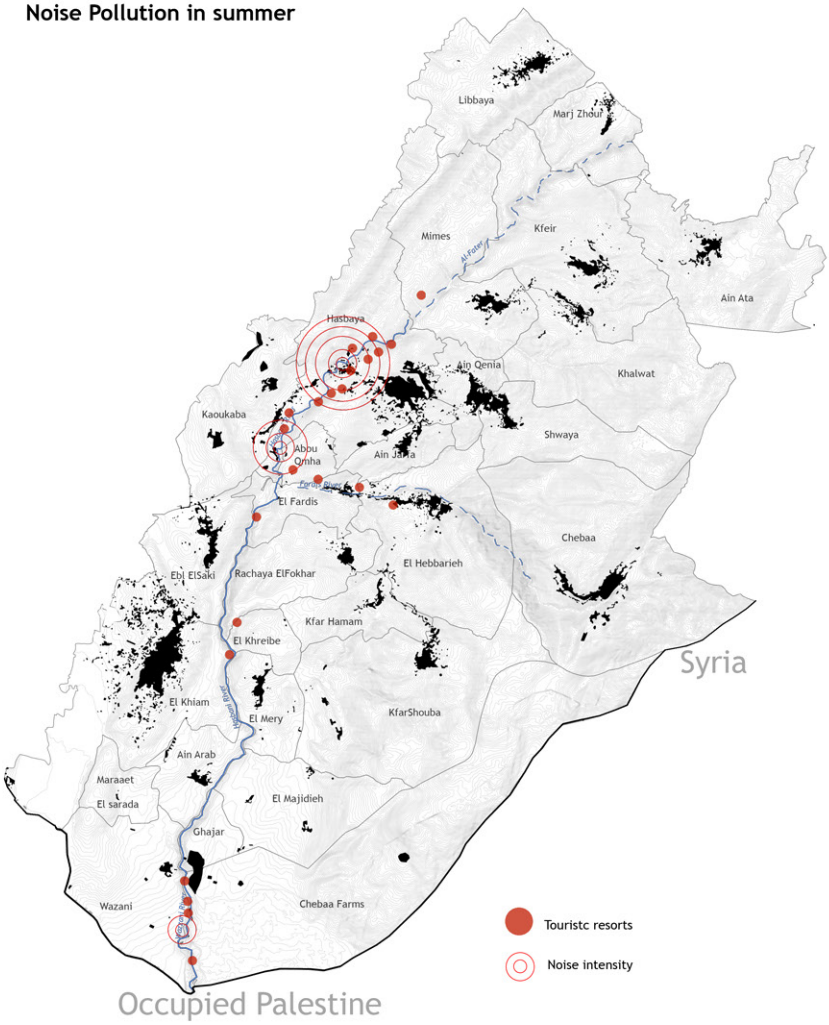
Teritiary roads



Internal roads



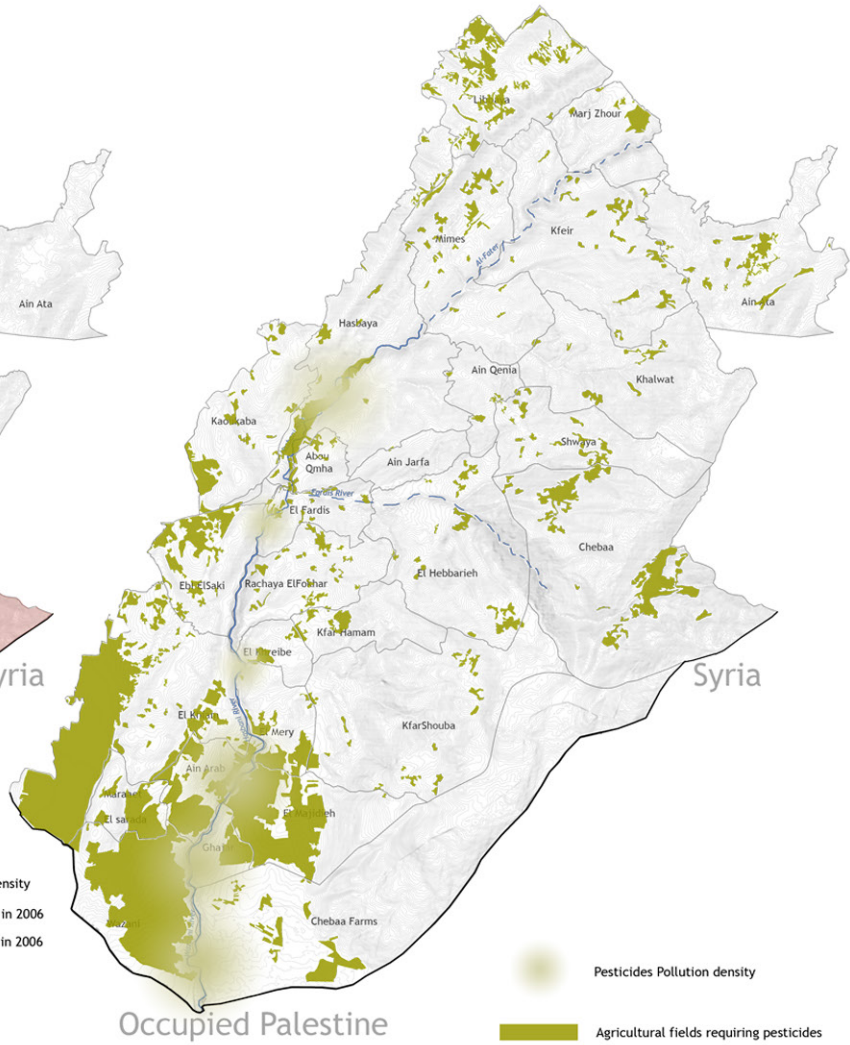
Noise Pollution in summer



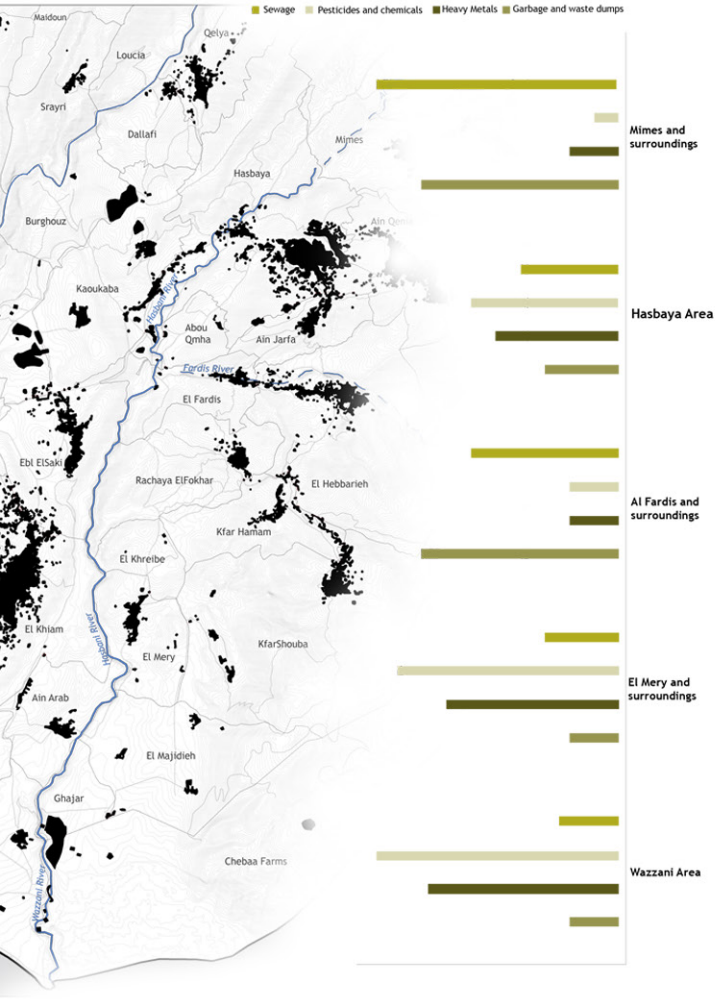
A N A L Y S I S

Industry and war resulting Pollution: Heavy metals

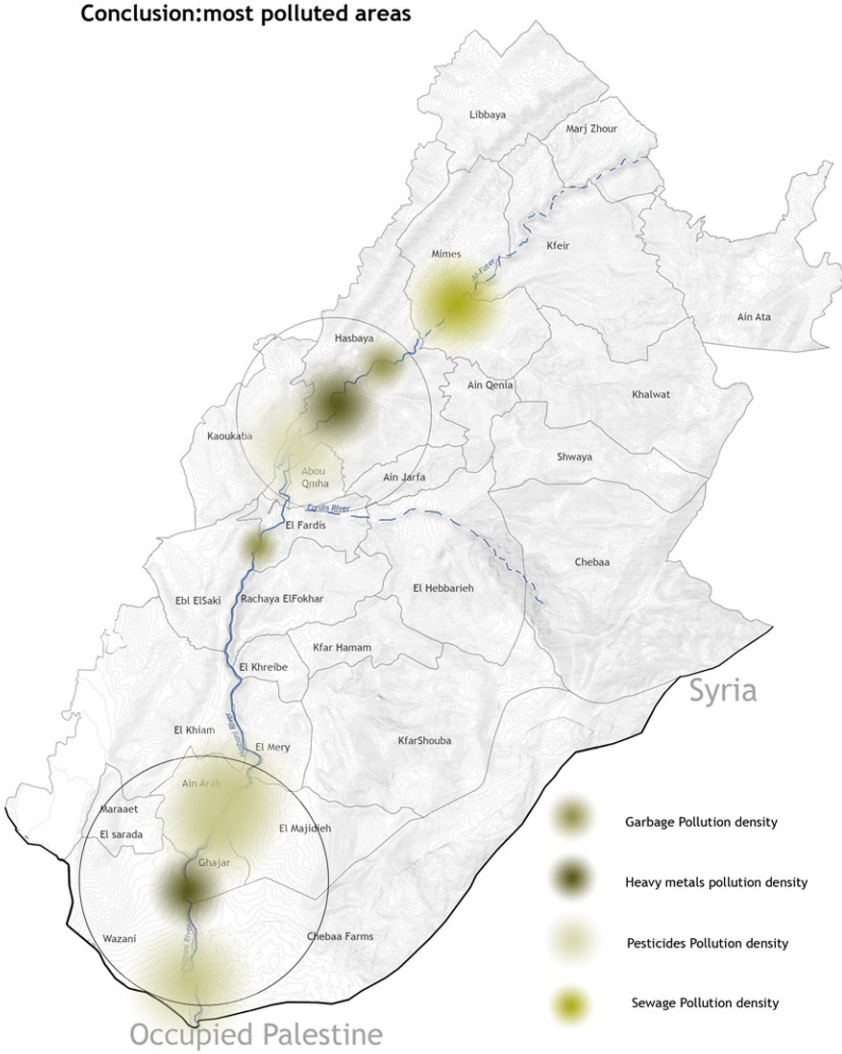
Agriculture resulting polution: Pesticides



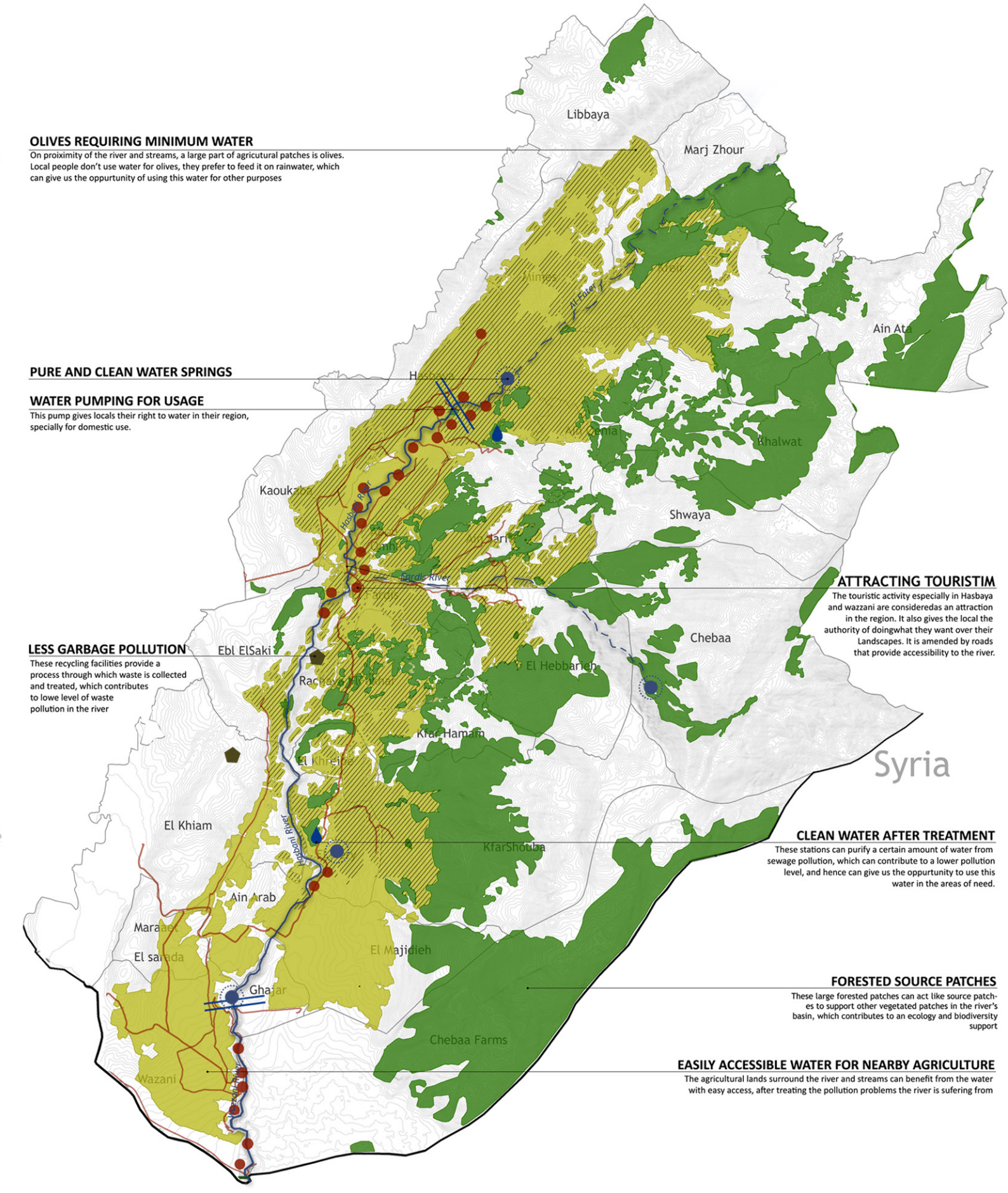
Water pollutants diagram



Conclusion:most polluted areas



OPPURTUNITIES



OLIVES REQUIRING MINIMUM WATER

On proiximity of the river and streams, a large part of agricutural patches is olives. Local people don't use water for olives, they prefer to feed it on rainwater, which can give us the oppurtunity of using this water for other purposes

PURE AND CLEAN WATER SPRINGS

WATER PUMPING FOR USAGE

This pump gives locals their right to water in their region, specially for domestic use.

ATTRACTING TOURISTIM

The touristic activity especially in Hasbaya and wazzani are considereda as an attraction in the region. It also gives the local the authority of doingwhat they want over their Landscapes. It is amended by roads that provide accessibility to the river.

LESS GARBAGE POLLUTION

These recycling facilities provide a process through which waste is collected and treated, which contributes to lowe level of waste pollution in the river

CLEAN WATER AFTER TREATMENT

These stations can purify a certain amount of water from sewage pollution, which can contribute to a lower pollution level, and hence can give us the oppurtunity to use this water in the areas of need.

FORESTED SOURCE PATCHES

These large forested patches can act like source patch-es to support other vegetated patches in the river's basin, which contributes to an ecology and biodiversity support

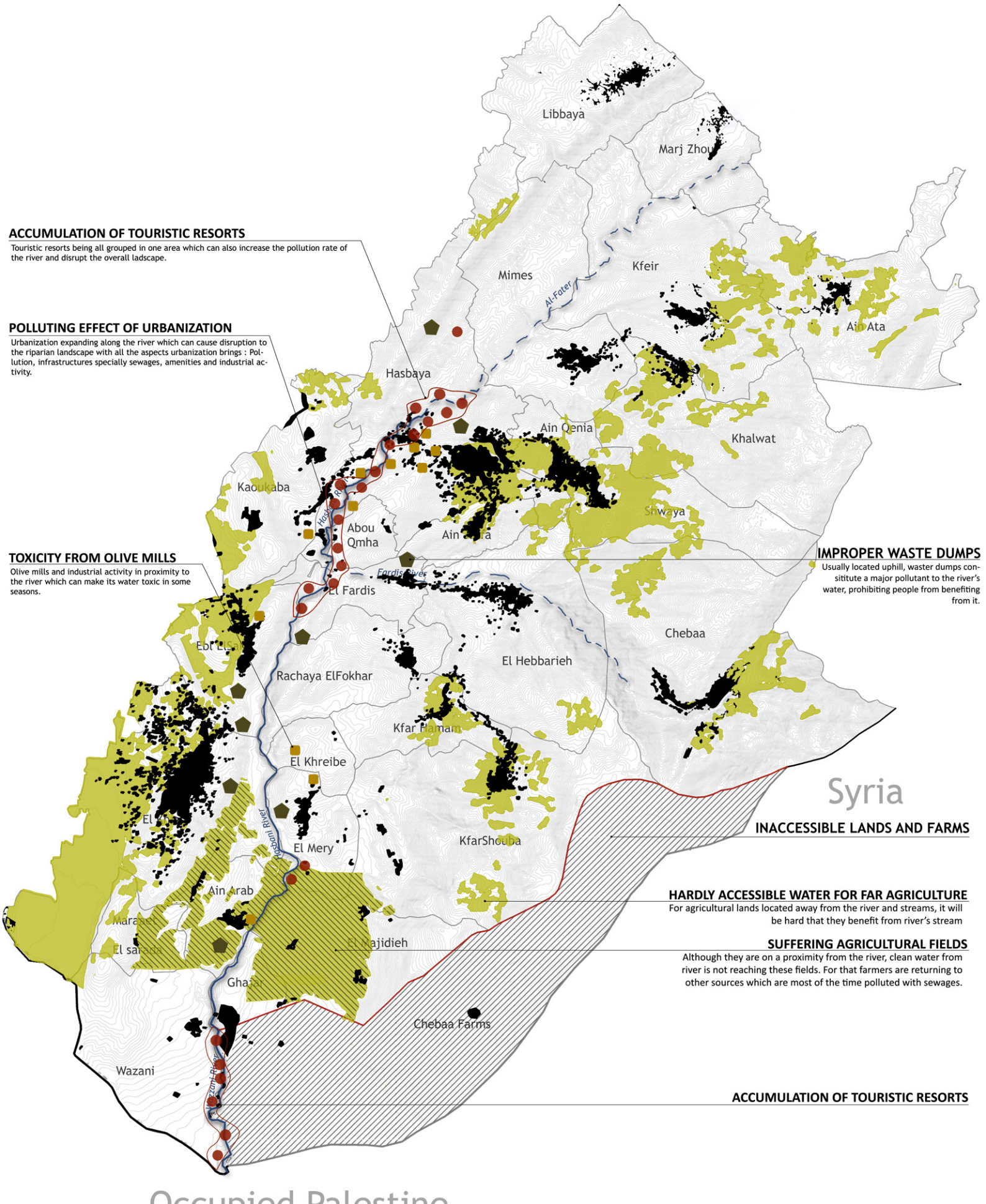
EASILY ACCESSIBLE WATER FOR NEARBY AGRICULTURE

The agricultural lands surround the river and streams can benefit from the water with easy access, after treating the pollution problems the river is sufering from

Legend

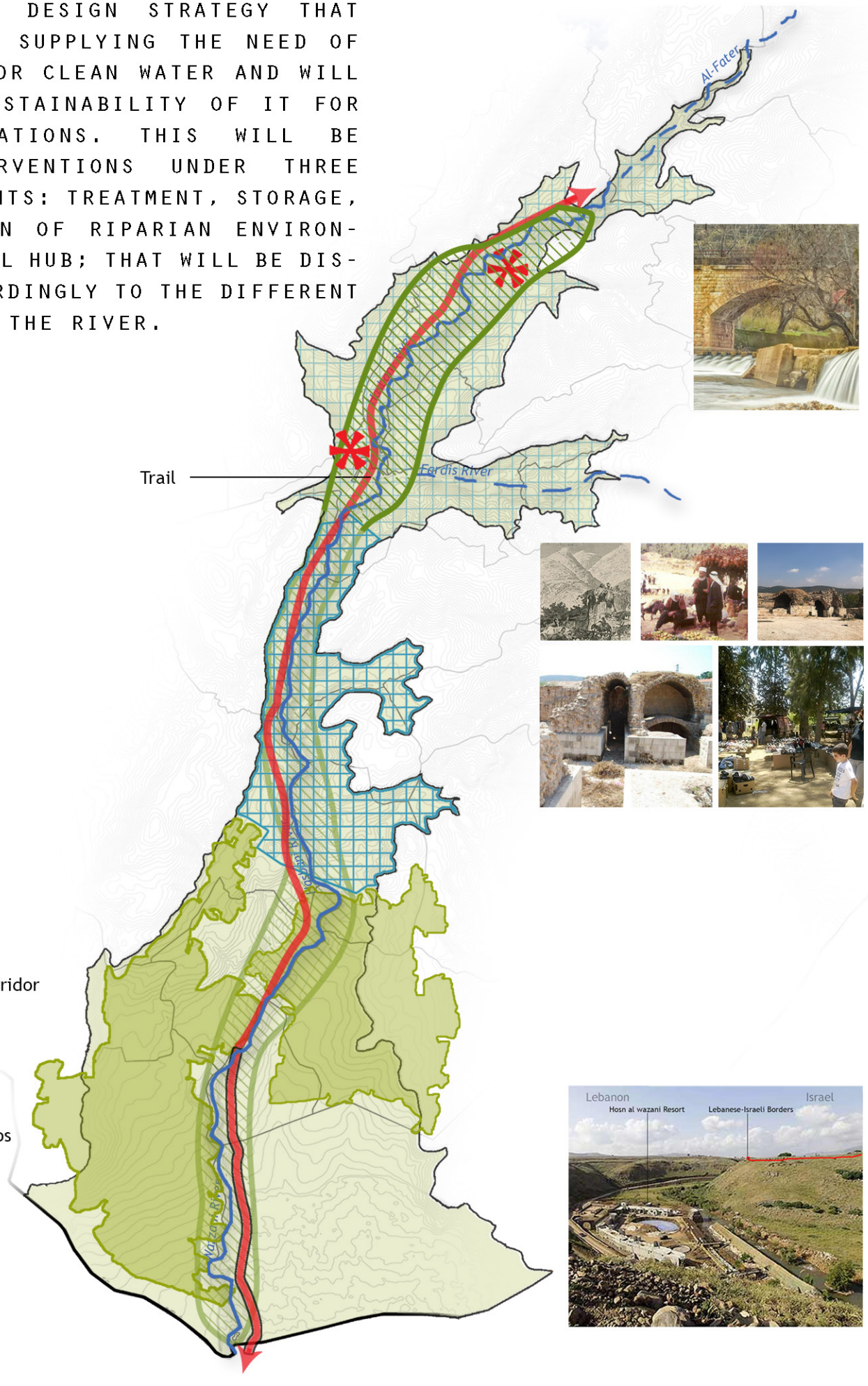
- Agricultural fields close to river and streams
- Agriculture that doesn't need water
- Roads infrastructure on proximity to the river
- Touristic resorts
- Water pumping station
- Water treatment station
- Garbage recycling facility
- Water spring

CONSTRAINTS



PROJECT CONCEPT

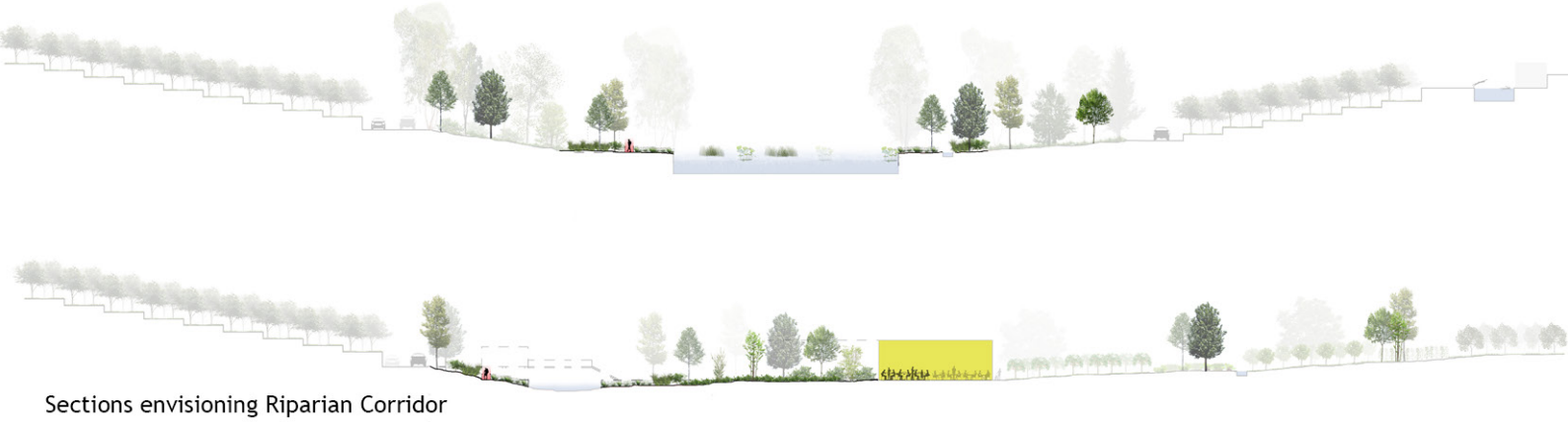
ON THE LARGE SCALE MY PROJECT WILL CONSIST OF A DESIGN STRATEGY THAT WILL CONSIDER SUPPLYING THE NEED OF COMMUNITIES FOR CLEAN WATER AND WILL ENSURE THE SUSTAINABILITY OF IT FOR FUTURE GENERATIONS. THIS WILL BE THROUGH INTERVENTIONS UNDER THREE MAJOR COMPONENTS: TREATMENT, STORAGE, AND RECREATION OF RIPARIAN ENVIRONMENT AS A LOCAL HUB; THAT WILL BE DISTRIBUTED ACCORDINGLY TO THE DIFFERENT TYPOLOGIES OF THE RIVER.



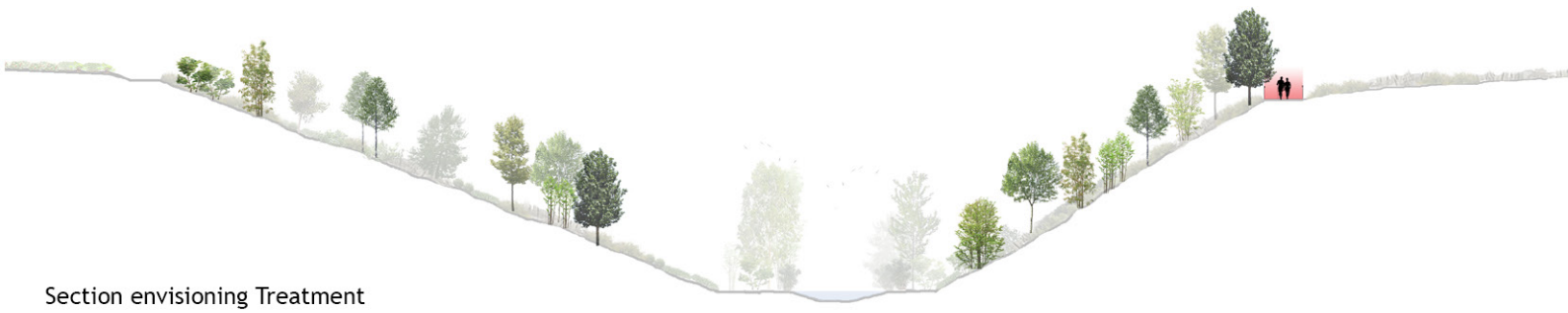
PROJECT CONCEPT

Mood image for treatment

Mood image for Storage



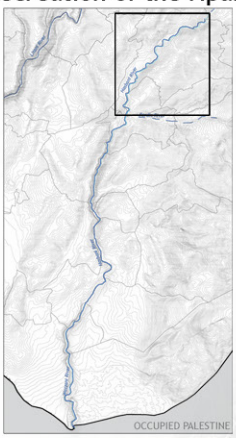
Sections envisioning Riparian Corridor



Section envisioning Treatment

Section envisioning Storage

Recreation of the riparian environment in Hasbaya - Existing conditions



Hasbaya

Hasbaya

Hasbaya

Hasbaya

Kaoukaba

Hasbaya

Kaoukaba

Abou Qamha

Al Fardis

Riparian buffer

Agriculture

100 meter green buffer

Existing Zoning and conditions

BTR (5% Residential, 25% touristic, 1 floor, 4 meters)

E (25% Residential, 50% trade, 3 floors, 11 meters)

100 meter green buffer

Hasbani source

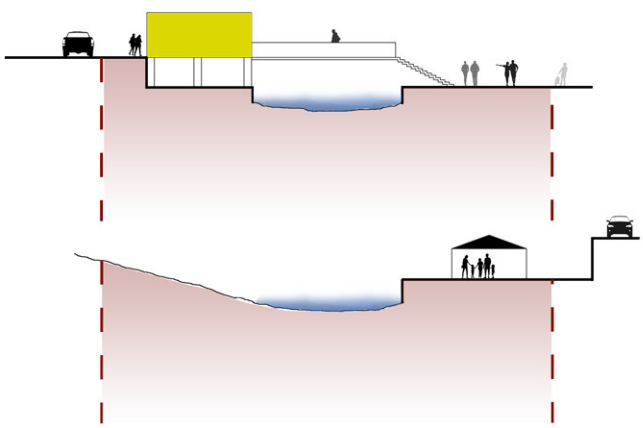
Agricultural water Dams

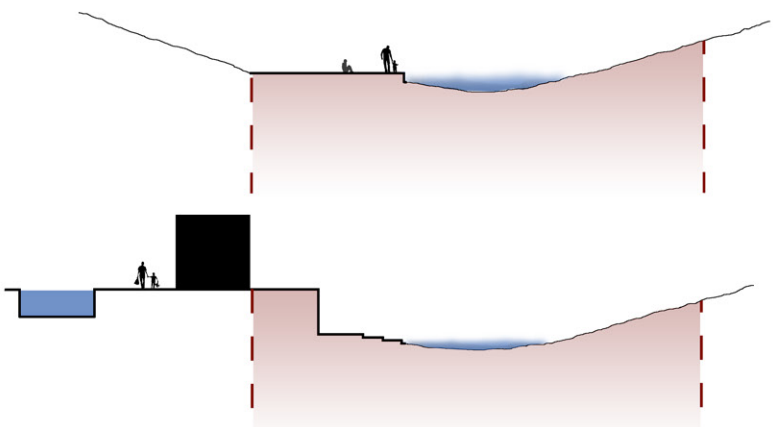
Cabins

Resorts and restaurants

Existing vegetation

Typologies of illegal interventions

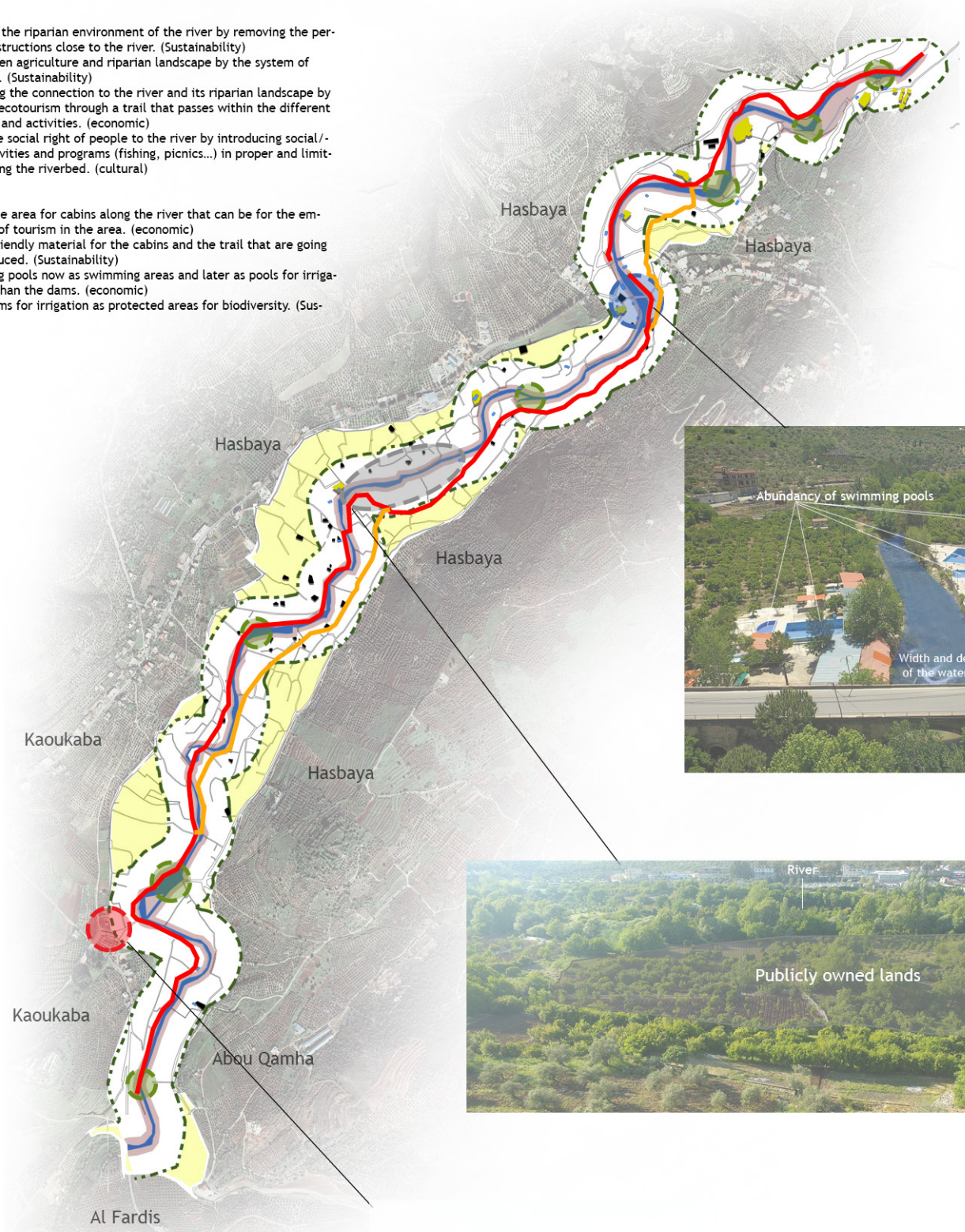




Recreation of the riparian environment in Hasbaya - Strategy

Actions:
Large scale
- Reclaiming the riparian environment of the river by removing the permanent constructions close to the river. (Sustainability)
- Link between agriculture and riparian landscape by the system of Agroforestry. (Sustainability)
- Empowering the connection to the river and its riparian landscape by introducing ecotourism through a trail that passes within the different experiences and activities. (economic)
- Reclaim the social right of people to the river by introducing social/-cultural activities and programs (fishing, picnics...) in proper and limited areas along the riverbed. (cultural)

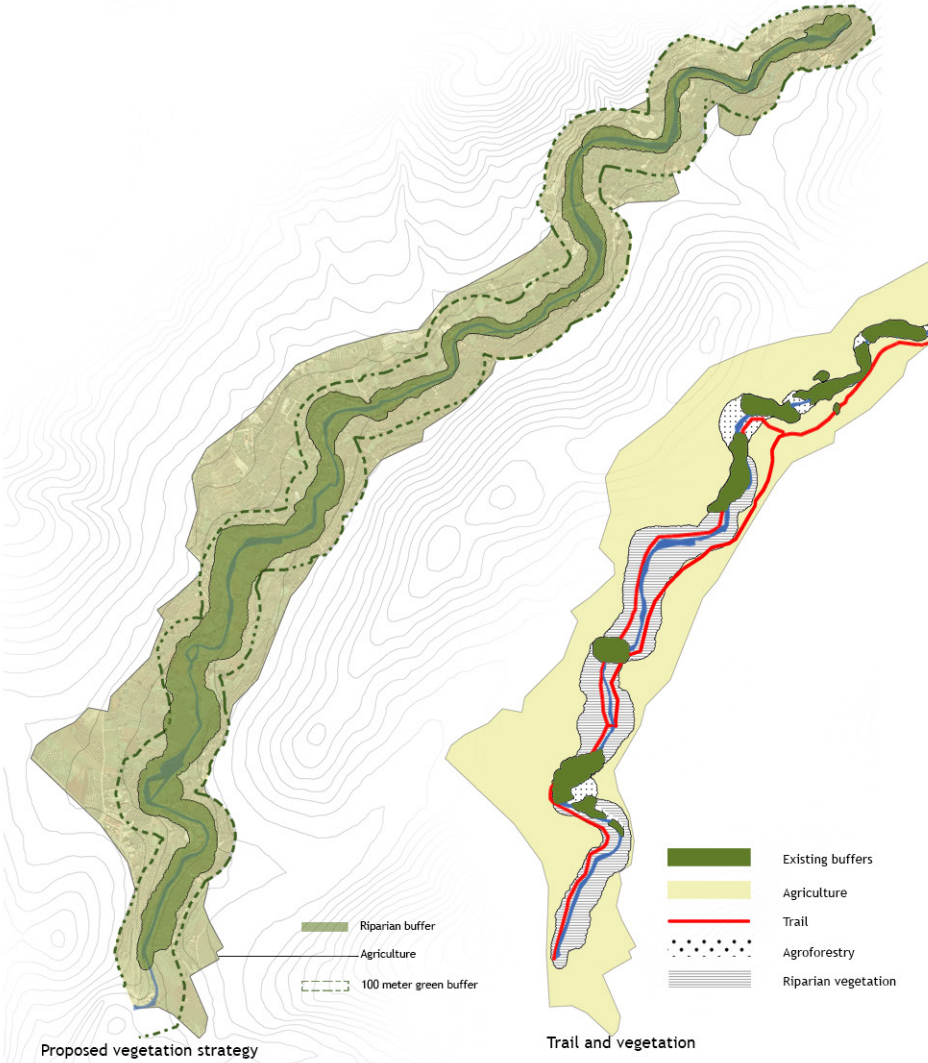
Small scale
- Allocate one area for cabins along the river that can be for the empowerment of tourism in the area. (economic)
- Using ecofriendly material for the cabins and the trail that are going to be introduced. (Sustainability)
- Use existing pools now as swimming areas and later as pools for irrigation rather than the dams. (economic)
- Use the dams for irrigation as protected areas for biodiversity. (Sustainability)



Proposed strategy

- BTR (5% Residential, 25% touristic, 1 floor, 4 meters)
- 15 meters set back from the river; Built removal
- 100 meter green buffer
- Limited access zones
- Market stop
- Water activities zone
- Picnic zone
- Trail
- Bike Trail

S T R A T E G Y & D E S I G N



Proposed vegetation strategy

Trail and vegetation

Section showing Agroforestry

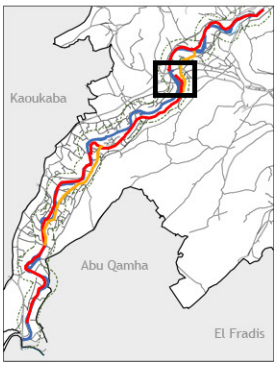
Section showing riparian restoration

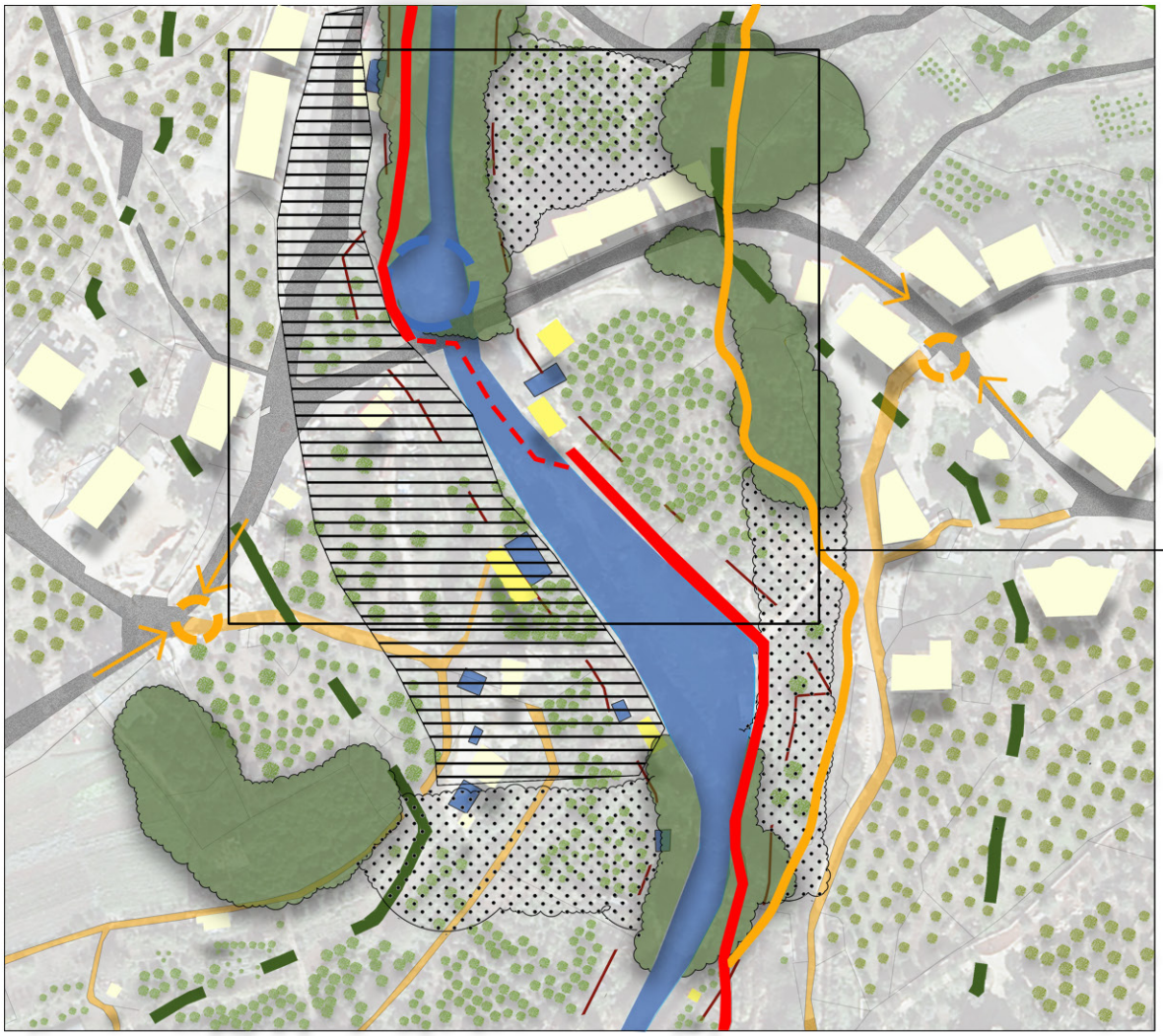
Trails and stops

Mood Image of trail above river

Mood Image of trail next to the river

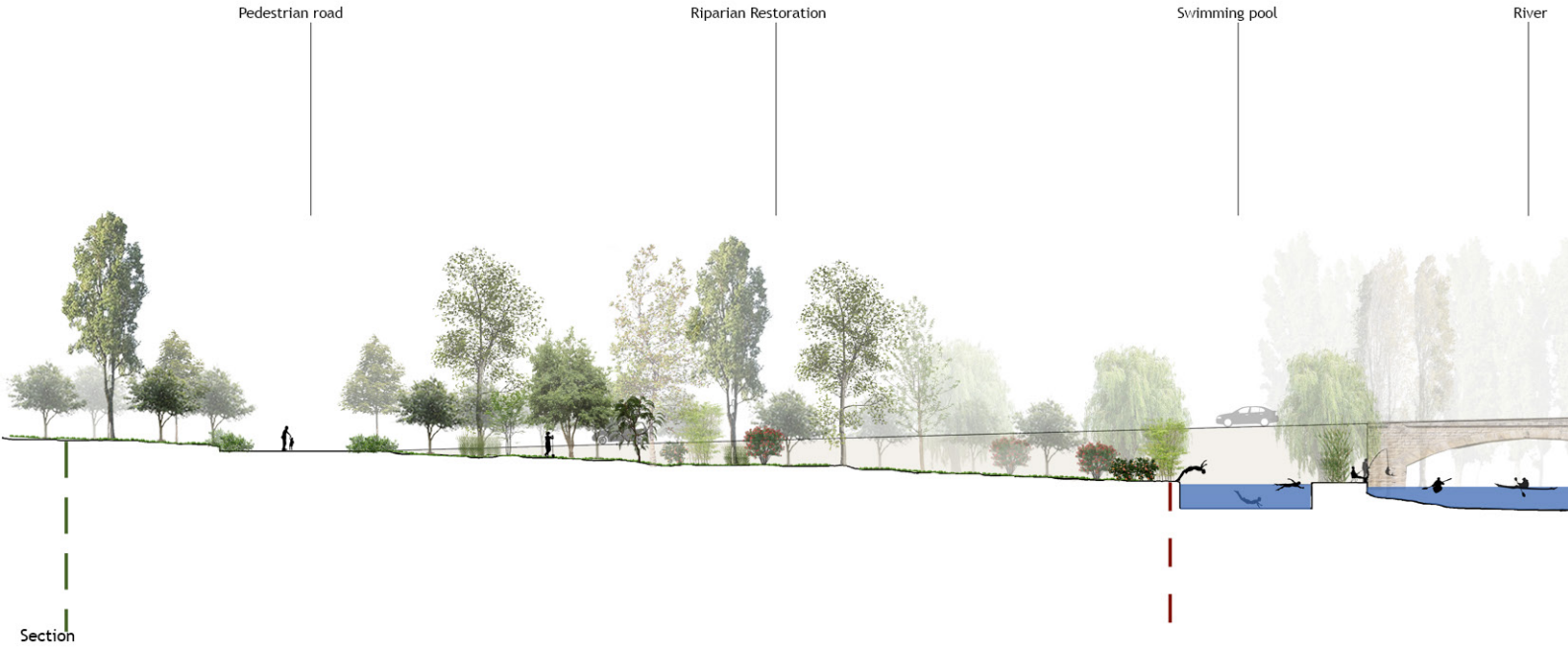
Water activities area





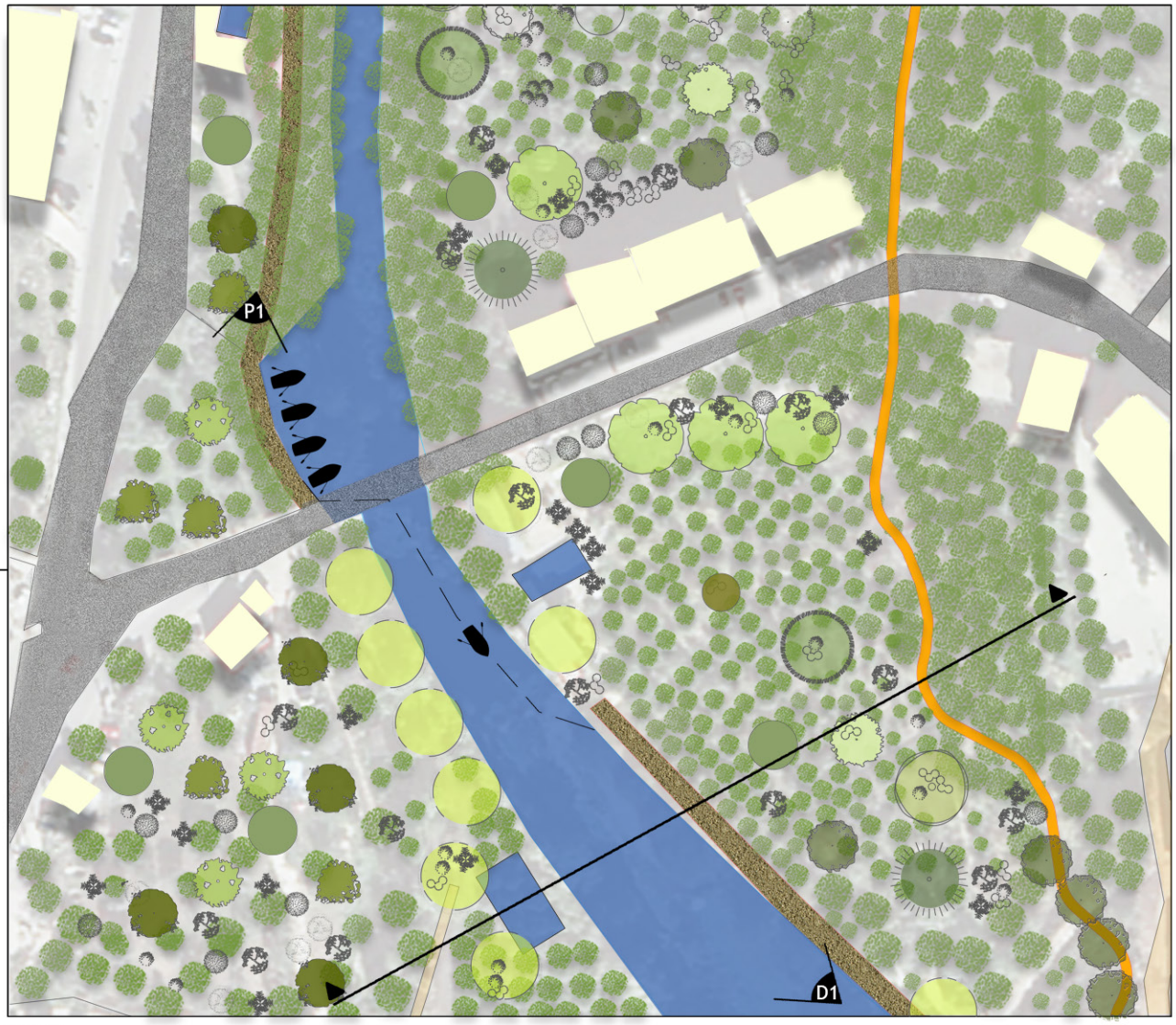
Stratgey diagram

- Connection through agroforestry
- Accessibility
- Parking
- Boats Parking
- 100 meters green buffer set back
- Pedestrian access
- Trail
- Riparian restoration
- Constructions to be removed
- 15 meters legal set back
- Biking Trail



Section

DESIGN INTERVENTIONS



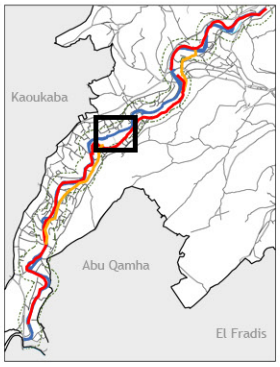
Zoom in

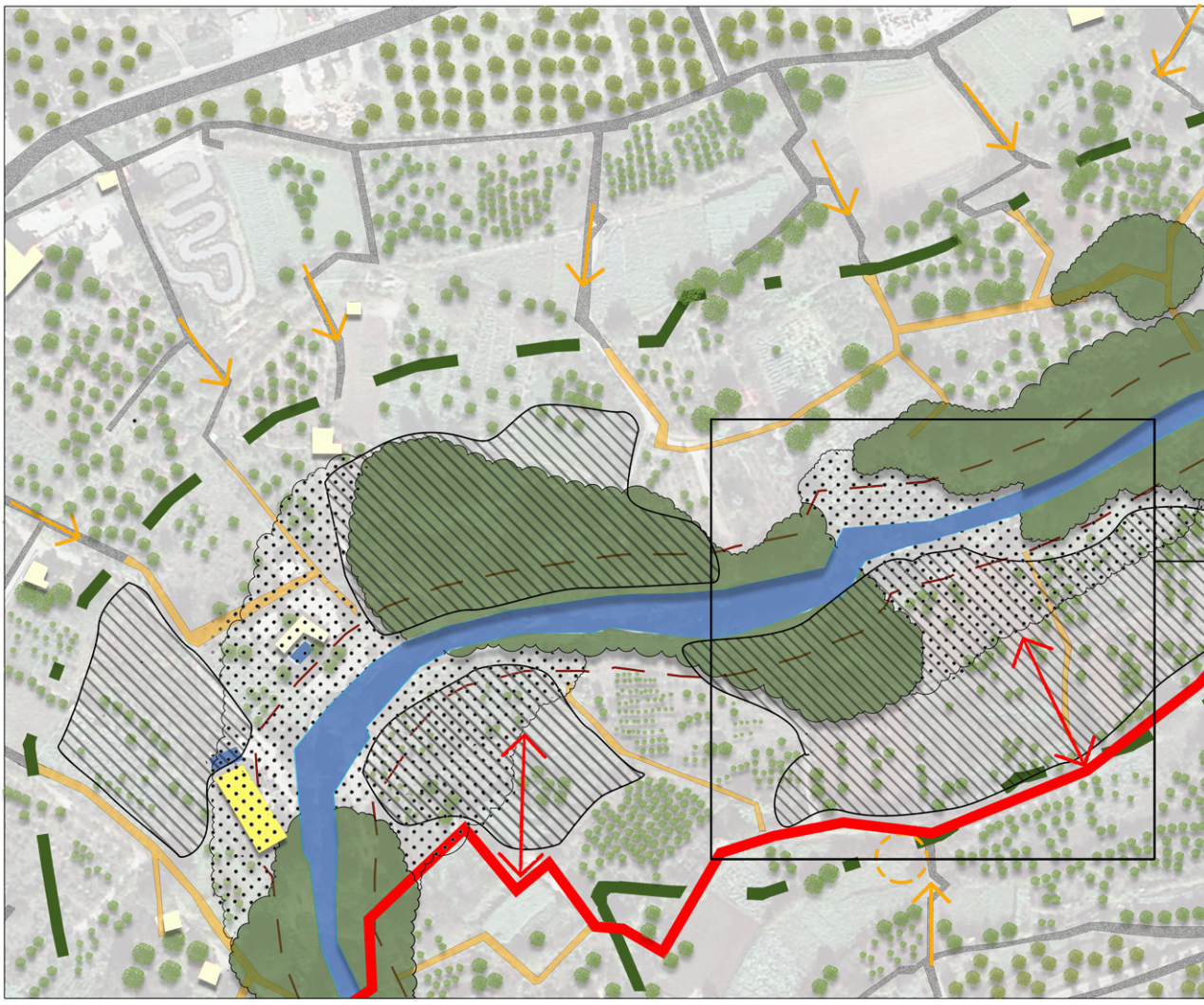
Bike lane

Walking trail

Pedestrian access

Picnic area



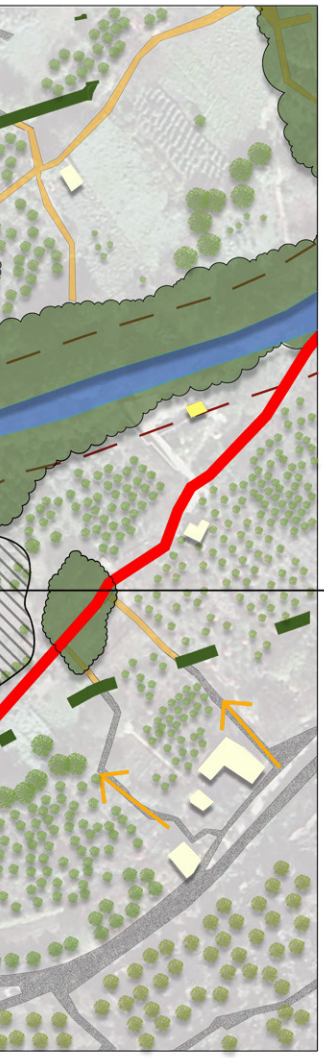


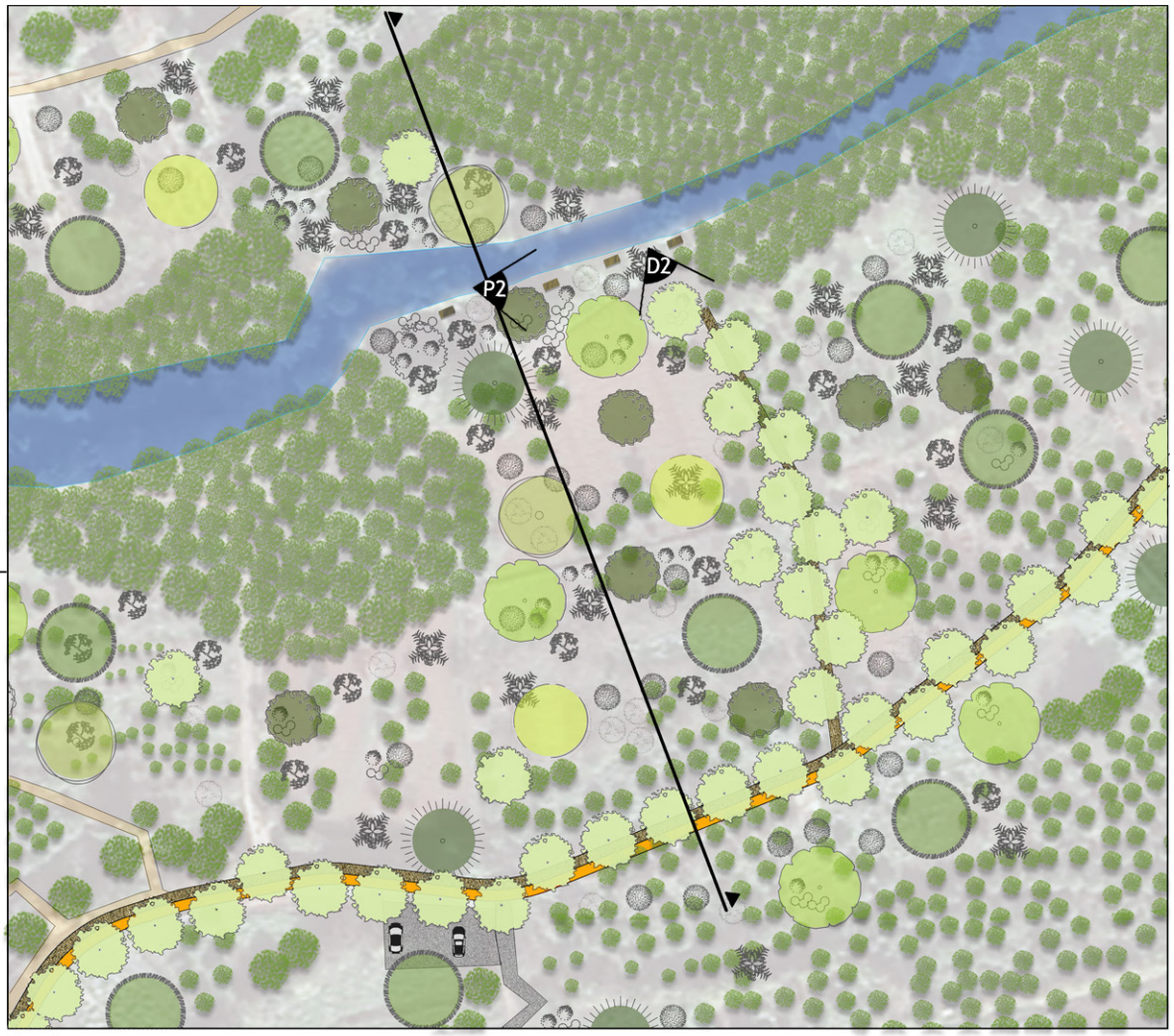
Strategy diagram

Connection through agroforestry
Accessibility
Parking
Constructions to be removed
15 meters legal set back
100 meters green buffer set back
Areas potential for picnic

Section

DESIGN INTERVENTIONS





Zoom in

Pedestrian access

Trail

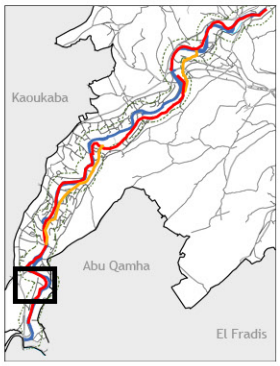
Visual connection

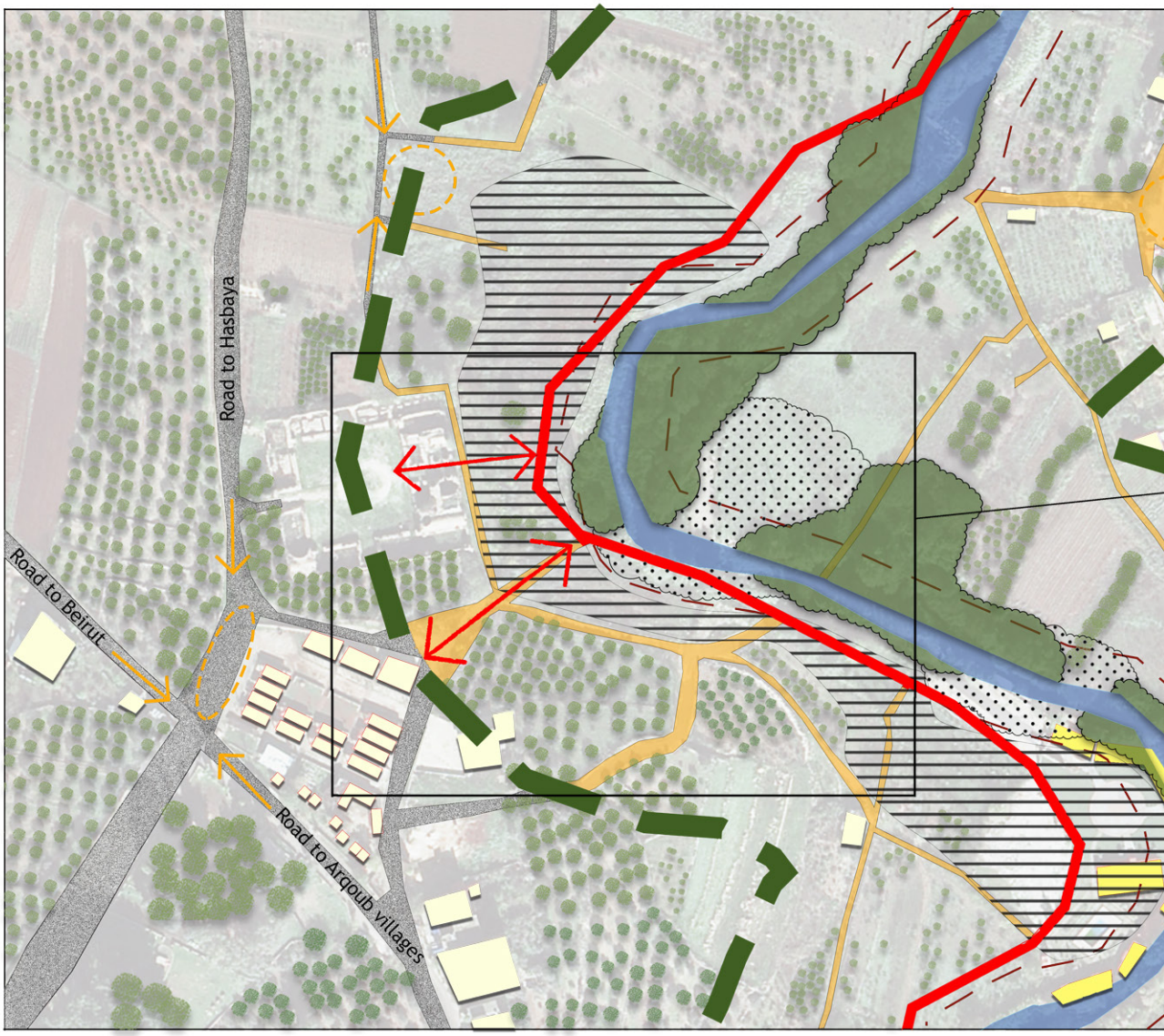
Bike lane

Walking trail

Pedestrian access

Market stop area

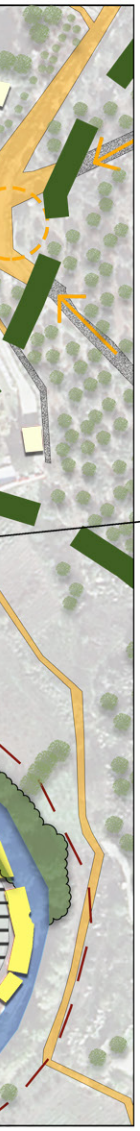


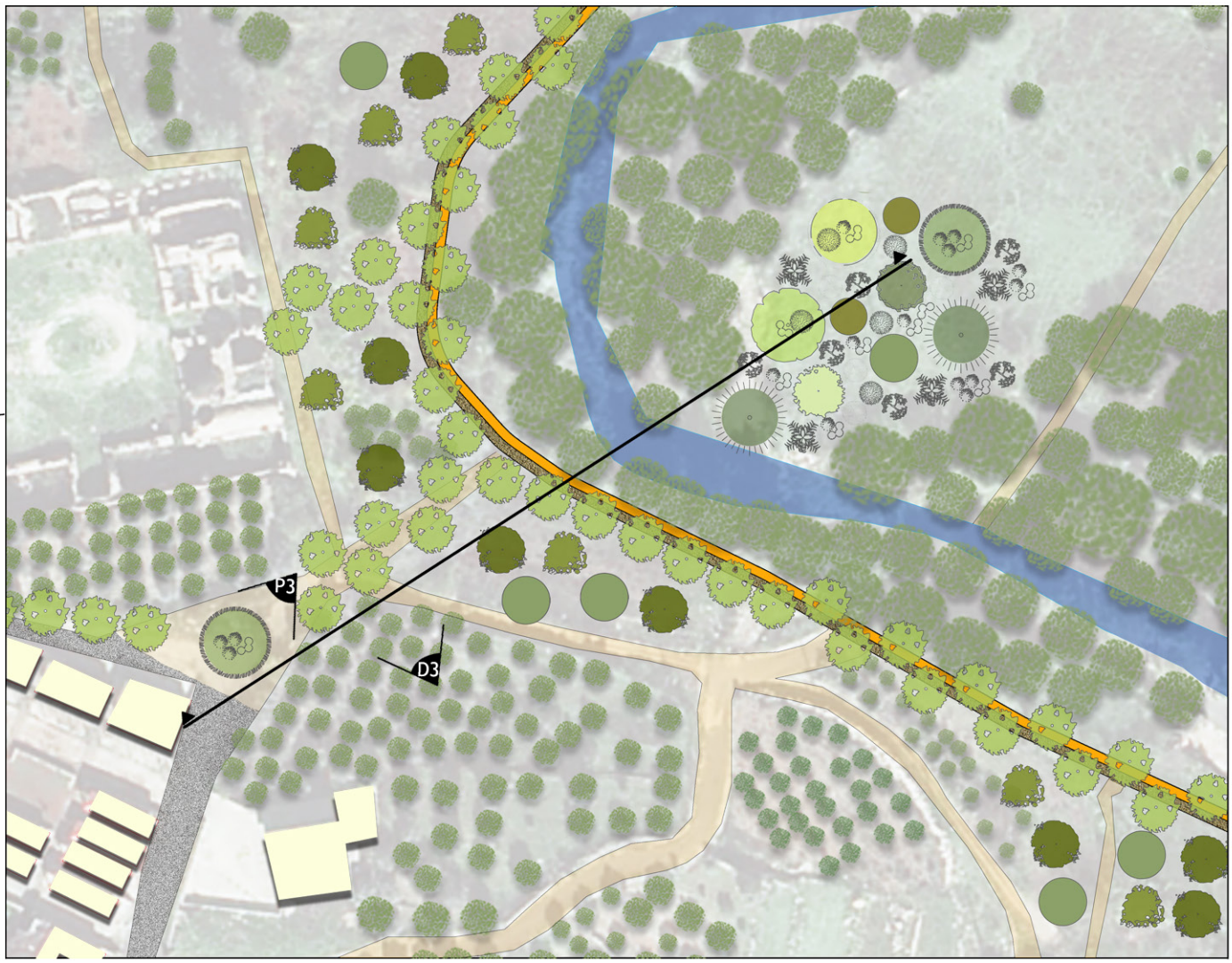


Strategy diagram

Connection through agroforestry
Accessibility
Parking
100 meters green buffer set back
Pedestrian access
Trail
Riparian restoration

Section





Zoom in

tions to be removed

rs legal set back

onnection

Bike lane

Walking trail

Pedestrian access

ils

River

Agroforestry

Drone perspectives

Water activities area (D1)

Picnic area (D2)

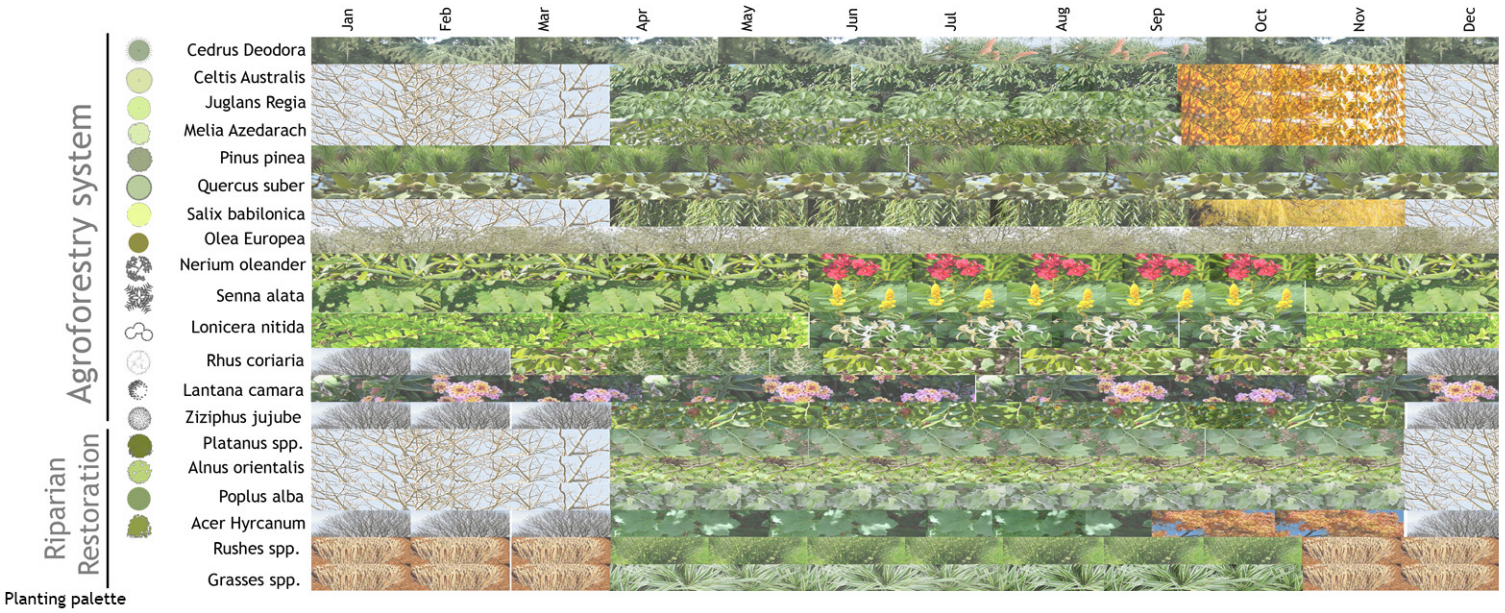
Market stop area (D3)

Detail perspectives

Boats actrivity in water activities area (P1)

Private benches in picnic area (P2)

Resting spot in market stop area (P3)



Planting palette

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